POND IDENTIFICATION, CLASSIFICATION, AND INUNDATION DYNAMICS AT ST. MARKS NATIONAL WILDLIFE REFUGE IN NORTHWEST FLORIDA, USA

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Abstract. The persistence and resilience of amphibian communities is largely dependent on adequate breeding habitat. This is especially important for threatened and endangered species that may often exist as isolated populations and have specific requirements for breeding. A study currently being conducted by the U.S. Geological Survey is investigating the feasibility of a repatriation effort of the Striped Newt (Notophthalmus perstriatus), a federal candidate species, within the St. Marks National Wildlife Refuge (SMNWR) in northwest Florida. This amphibian species requires ponds that are free of fishes and, for this reason, generally chooses ephemeral ponds as breeding sites. The delineation of potential breeding habitat is a first step in selecting candidate areas for repatriation. To achieve this, a LIDAR (Light Detection and Ranging) derived digital elevation model (DEM) and a topographic position index (TPI) classification scheme was used to identify and classify isolated depressions across the landscape. In addition, the perimeters of twenty-two field identified ephemeral ponds were surveyed with a high precision RTK GPS (Real Time Kinematic Global Positioning System) unit to provide a calibration dataset to evaluate the performance of the feature identification method. This set of ponds was also instrumented with water-level recorders to investigate inundation dynamics across a wide range of hydrologic conditions. We anticipate being able to classify pond hydroperiod—thus each pond's potential as breeding habitat—at the monitored locations through this combination of approaches. Using estimates of pond size, morphology, and landscape position derived from the DEM, the classifications will be extended to other ponds on the refuge.