An Endangered Grass "Falls" for a Complex Hydrologic Regime in Everglades National Park

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Hydrologic regimes strongly influence plant population dynamics over time in seasonally flooded environments. Aspects of the hydrologic regime, such as the seasonal timing, magnitude, and frequency of flooding, should be considered when managing populations of endangered plant species in seasonally wet places. We tested the response of *Digitaria pauciflora*, a federally endangered grass, to different flooding regimes of Everglades National Park, where the extent and duration of flooding is generally greater during the wet season but varies spatially along topographic gradients. We established demography plots at both ends of *D. pauciflora*'s elevation range. We measured vital rates, including growth, survival, and reproduction, annually for four years (2020-2023). Results showed that *D. pauciflora* has a patchy distribution across the landscape, likely because it reproduces seasonally through vegetative reproduction via plantlets. Mature plants produce plantlets that remain on the plant until they become heavy and fall, placing plantlets in direct contact with the ground. The plantlets can then begin rooting, provided they land in suitable microsites that are not flooded. We found that *D. pauciflora* had increasing population growth in lower elevation areas, but only when seasonal flooding ended before plantlets fell to the ground. In these instances, *D. pauciflora* had both higher establishment and survival. During extended flooding events, the establishment of new plants was rare, causing a net decrease in population size (i.e., greater mortality than establishment). We suggest that *D. pauciflora* has a "boom or bust" population demography. Over the long term, this cycle should maintain populations of *D. pauciflora* provided bust years do not outnumber boom years during which the population can recover. *Digitaria pauciflora* and other plant species might be considered indicator species and should be recurrently monitored to guide the restoration of hydrologic regimes in Everglades National Park and elsewhere.

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