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LONG-TERM EFFECTIVENESS OF HYDROLOGIC MANAGEMENT OF NATIVE AND EXOTIC PLANTS IN A LARGE WETLAND COMPLEX IN THE LOWER COLUMBIA RIVER FLOODPLAIN

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ABSTRACT: We sought to determine the effect of managed inundation on plant distribution in a large palustrine wetland complex, the Smith and Bybee Wetlands Natural Area (SBW), in northwestern Oregon. Human activity has fundamentally altered the hydrologic cycle at floodplain wetlands along the Columbia and Willamette rivers, attenuating spring freshet flows and prematurely initiating the summer drying period. These alterations have degraded ecological function and encouraged the establishment and spread of invasive plants (e.g., reed canarygrass, *Phalaris arundinacea* L.) at wetlands such as the 800 ha SBW in North Portland, Oregon. Natural Area managers installed a water control structure between SBW and the Columbia Slough/River system to approximate the ecological benefits that natural flooding provided as well as reduce the abundance of reed canarygrass. We conducted intensive vegetation and hydrological monitoring in 2003 (during the season immediately before structure installation), 2004, 2008 and 2009. We randomly established 26 permanent transects (cumulative length of 2.4 km) within the elevation zone that was most affected by reed canarygrass invasion and would be most influenced by the managed flooding. Each study year, we estimated the percent cover of all vegetation based on presence/absence data collected along the transects using the line-intercept method at 10 cm intervals. The 2004, 2008, and 2009 study results show an increased cover of native plant communities and a reduced cover of reed canarygrass when compared to the 2003 baseline data. Native Columbia sedge (*Carex aperta* Boott) cover increased 7-fold from 0.33% to 2.4%; water-smartweed (*Polygonum* spp.) cover increased 3-fold from 20.2% to 62%; and Pacific willow (*Salix lucid*a Muhl. ssp. *lasiandra* (Benth.) E. Murray) cover increased 1.5-fold from 10.9% to 17.1% cover. Reed canarygrass, the primary invasive plant at Smith-Bybee, declined by over one-third from 44.4% to 27.8% cover following water management. Since hydrology management began in 2003, the native water-smartweed community has replaced reed canarygrass as the dominant species in the emergent zone. The findings of this study demonstrate the effectiveness of mimicking the historic pattern of hydrology in palustrine wetlands to enhance native communities and reduce the establishment and spread of invasive plants.

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