Developing a National Vegetation Multimetric Metric Index of Wetland Condition for the Conterminous United States

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Background/Question/Methods

The U.S. Environmental Protection Agency (USEPA), with states, tribes, and other partners, conducted the first-ever National Wetland Condition Assessment (NWCA) in 2011, using a survey design allowing extrapolation of results to national and regional scales. As part of the NWCA, we developed a Vegetation Multimetric Index (VMMI) reflecting ecological condition. Data describing vegetation, soil, hydrology, and stressors were collected from 1,138 sites (0.5 ha Assessment Areas (AAs)), representing seven major estuarine and inland wetland types across the contiguous United States. Plant species identity, abundance, and other data were collected from five 100-m^2 plots in each AA. Species trait descriptors (plant category, growth habit, duration, wetland indicator status, native status, and coefficients of conservatism) were gathered or developed by state or region for all observed taxa. Vegetation field and trait data were combined to generate 405 candidate condition metrics that were evaluated based on range, repeatability, and efficacy in distinguishing least from most disturbed sites. Forty-eight metrics passed all screens and were considered for inclusion in numerous potential VMMIs representing regional, wetland type, or national scales. Each VMMI was assessed based on signal:noise ratio, low correlation (i.e., low redundancy) among metrics, and ability to distinguish least from most disturbed sites.

Results/Conclusions

The best performing index of wetland condition was a national scale VMMI with four metrics: Floristic Quality Assessment Index, Relative Importance of Native Taxa, Number of Disturbance Tolerant Species, and Relative Cover of Native Monocots. Thresholds for good, fair, and poor ecological condition were based on distributions of VMMI values for least disturbed sites within ten ecoregion by wetland type Reporting Groups. The extent of wetland area (acreage or percent) in good, fair, and poor condition was estimated using site weights and VMMI site values for the 974 probability sites from the NWCA survey design. Nationally, approximately 48% ($\pm$ 6) of target wetlands were estimated to be in good condition, 20% ($\pm$ 4) in fair condition, and 32% ($\pm$ 6) in poor condition. Results of the 2011 NWCA provide baseline description of wetland quality across the Nation that can help inform decision-making regarding use, management, and protection of wetland resources, and can be used to identify relationships between condition, ecological stressors, and ecosystem services. Subsequent iterations of the NWCA are planned at 5-year intervals, the next beginning in 2016, will allow trends analysis for changes in wetland condition. This is an abstract and does not necessarily reflect EPA policy.