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Adaptation of Level 1-2-3 Assessment Methods for Ambient Monitoring of Underrepresented Wetlands

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Abstract

USEPA's Level 1-2-3 assessment framework provides a robust approach for ambient monitoring of wetlands. Comprehensive application of the framework requires tools that have been developed and calibrated for all wetland types of interest. Tool development is typically prioritized for common wetlands or wetlands of management priority. Less common or underrepresented wetlands are often excluded from regional monitoring programs because of the lack of assessment tools. Developing new assessment tools may require several years of data collection and substantial investment of resources, which may not be an option for some management programs. In this study, we explore the adaptability of Level 1 and 3 assessment tools for depressional wetlands in southern California, which are a wetland type of management concern but for which assessment tools don't currently exist. We demonstrate the application of probability based status and trends plots to provide a Level 1 assessment of unmapped wetlands. We also adapt two Level 3 assessment tools developed for other regions and other wetland types for use in southern California depressional wetlands; an invertebrate index of biotic integrity (IBI) developed in the San Francisco Bay region for application in the drier regions of southern California (i.e. geographic transferability), and a riverine benthic diatom IBI for application to depressional wetlands (i.e. water body type transferability). Performance of the adapted indices was compared to that of an existing Level 2 assessment tool (the California Rapid Assessment Method; CRAM) that has been developed for statewide application of depressional wetlands. Recalibrating both the macroinvertebrate and diatom indices to reference thresholds based on nutrient concentrations resulted in lower coefficient of variation among reference sites, greater differentiation between reference and non-reference and stronger relationship with stressors than when reference thresholds were based on landscape disturbance. Functional metrics transferred better than metrics based on taxonomic composition in the adjusted indices. Overall, the simple adjustment of the reference definition allowed us to transfer the indices with no structural changes to the metrics. This approach can facilitate future index adaptations that allow practitioners to include waterbody types for which there is no current index into routine monitoring programs.