Development and Analysis of Avian Index of Biological Integrity for Kentucky Wetlands

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Bird communities are frequently used as bioindicators to assess environmental conditions, including in wetland habitats. We developed an avian index of biological integrity (IBI) for wetlands of Kentucky as an intensive assessment method to supplement an existing rapid assessment method used in regulatory programs. Birds are useful indicators because they are sensitive to environmental changes, abundant in various landscapes, occupy higher trophic levels, and can be sampled in a cost-effective manner. Breeding bird point count data from 140 sites were used to calculate a set of metrics, including avian community measures and guilds based on relative abundance. Metrics were tested for correlation with an independent measure of wetland condition based on landscape and site stressors. High performing, non-repetitive metrics were tested in various combinations to find avian community metrics that best predicts wetland condition. Final metrics were scaled and assembled into an IBI. We found four superior metrics to be correlated with the independent disturbance index. Insectivorous and foliage-gleaning guilds had higher relative abundance at higher condition wetlands, while omnivorous and ground-gleaning guild percentages had higher relative abundance at lower condition wetlands. Guilds represented in these metrics included more species than other metrics tested, creating a greater degree of variation within the guild to correlate to the disturbance index. Previous studies in other regions found similar results with insectivorous and foliage-gleaning guilds being intolerant to human disturbance, whereas omnivorous and ground-gleaning guilds tend to be more tolerant. This cost-effective and time-efficient IBI complements existing assessment tools for wetlands of Kentucky.