Application of the Landscape Development Intensity (LDI) Index in Wetland Mitigation Banking

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ABSTRACT

The landscape development intensity (LDI) index, which can be used as a human disturbance gradient, is an effective tool in assessing location of wetland mitigation banks where large tracts of land are managed to protect wetland function by offsetting wetland losses from off-site land development. As part of a larger study to determine the effectiveness of mitigation banking in Florida, this article focuses on characterizing the landscape intensity of wetland mitigation banks in the state. Two scales of the LDI index were calculated: wetland assessment area scale LDI index (n = 58), which characterizes the landscape surrounding a small parcel of land within a mitigation bank boundary, and mitigation bank scale LDI index (n = 26), which characterizes the lands surrounding the entire boundary of the wetland mitigation bank. Approximately two-thirds of the wetland assessment areas (n = 38) had LDI index scores less than 2.0 (where 0.0 represents no human development), with a mean LDI index score of 3.2 (σ = 4.9). LDI index scores were calculated such that all lands within the 100 m zone surrounding a wetland assessment area designated as restoration, enhancement, creation, or preservation were assigned LDI index scores reflecting natural lands. In this application, the LDI index score was considered a tool to predict potential wetland condition based on successful restoration. Bank scale LDI index scores, based on land use within the 100 m zone surrounding the entire mitigation bank, were generally higher than assessment area scores, with a mean bank scale LDI index score of 7.8 (σ = 5.4) and a median of 6.5. At the wetland scale, evaluation of landscape condition using the LDI index presented a quantitative analysis tool to determine potential ecological lift (i.e. expected gain in ecological condition) with successful wetland restoration practices within the mitigation bank. Whereas at the bank scale, LDI index calculations suggested the expected impacts from human land use activities outside of the control of the bank property. We propose using the LDI index to facilitate calculation of wetland mitigation potential and credit awards for mitigation banks, and that regardless of the tool used consideration of potential wetland functional lift should incorporate a landscape perspective.

Citation
