GIS-Based Expert Systems Model for Predicting Habitat Suitability of Blackside Dace

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This study presents a GIS-based predictive habitat suitability model for the blackside dace, a federally-listed threatened species of the Upper Cumberland River basin in southeastern Kentucky. The model is a rules-based system which incorporates expert knowledge about habitat preferences for the species. The five habitat factors identified by experts and included in this model are stream gradient, canopy coverage, riparian vegetation type, riparian zone width, and stream order. Using GIS, the five habitat parameters were parameterized and combined across the entire stream network. Combinations were evaluated by blackside dace experts in terms of habitat suitability. The resulting model was tested against known blackside dace occurrences using locational modeling statistics. This analysis demonstrates success at identifying stream areas of both high and low likelihood of occurrences. Model results could be of particular usefulness to transportation planners in identifying sensitive areas in the landscape that may impact transportation planning.