

HELLBENDER (*CRYPTOBRANCHUS ALLEGANIENSIS*) GENE FLOW WITHIN RIVERS OF THE
MISSOURI OZARK HIGHLANDS

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ABSTRACT

For species of conservation concern, effective management includes maintaining robust population sizes while monitoring and promoting genetic variability. For hellbenders (*Cryptobranchus alleganiensis*), an aquatic salamander species experiencing dramatic declines in population size, little is known about genetic variation at the within-river scale and whether habitat patches within rivers are genetically and/or demographically connected. Given that suitable habitat patches are isolated, and that hellbenders exhibit extreme site fidelity, gene flow may be restricted among these discrete habitat patches. Using several polymorphic microsatellite loci, I assessed the fine-scale genetic relationships between hellbenders occupying various habitat patches within a river. My results indicate that a substantial amount of gene flow is occurring between habitat patches, with no evidence to support genetic differentiation between patches. Since dispersal is the mechanism driving gene flow, it can be inferred from this data that hellbenders disperse, with dispersal hypothesized to occur during the larval and/or juvenile phase. Dispersal can occur in both males and females. However, the propensity for one sex to disperse more frequently than the other is driven by evolutionary forces and mating strategies. Using molecular techniques, I investigated differential dispersal between males and females in order to evaluate sex-biased dispersal in hellbenders. My results suggest that male and female hellbenders disperse, and that both sexes contribute to the observed levels of gene flow. Because hellbender populations are experiencing low juvenile recruitment in addition to the declines in population size, I compared heterozygosity levels in survived and dead offspring to evaluate how genetic diversity influences offspring survival. My results suggest that heterozygosity-fitness correlations would be an intriguing area of research to pursue in future studies, and may give further insight into causes for hellbender declines.