

NORTHERN ILLINOIS UNIVERSITY

REINTRODUCTION OF EXTIRPATED FLATWOODS AMPHIBIANS INTO RESTORED  
FORESTED WETLANDS IN NORTHERN ILLINOIS: FEASIBILITY ASSESSMENT,  
IMPLEMENTATION, HABITAT RESTORATION AND CONSERVATION IMPLICATIONS

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ABSTRACT

This study examines the feasibility of reintroduction of three extirpated amphibians; spotted salamanders, wood frogs, and spring peepers into MacArthur Woods Forest Preserve (MWFP) in Lake County, Illinois. MWFP is a flatwoods wetland north of Chicago that represents the largest remnant tract of continuous forest in Lake County, Illinois. I examined the response of the amphibian community of MWFP to intensive habitat restoration implemented in 2000. Habitat restoration efforts included hydrologic alteration and removal of the exotic invasive shrub, European buckthorn. Four years after restoration commenced, I assessed the post-restoration amphibian community to determine if natural recolonization of the extirpated species had occurred. I examined amphibian response to restoration through changes in species diversity over time. After determining that natural recolonization had not occurred, I assessed feasibility of reintroduction for the three extirpated species from nearby extant source populations. Feasibility assessment included evaluation of restored habitat quality to ensure survival and recruitment of reintroduced amphibians, identification of threats to amphibian recruitment and persistence, and recommendations for additional restoration needs. I used a series of *in situ* experiments to compare hatching success and larval survival of amphibians in source population sites and restored sites. I compared hatching success and larval survival of the extirpated spotted salamander with its congener, the blue-spotted salamander that had persisted in MWFP. Using hatching experiments, I identified dissolved oxygen requirements of spotted and blue-spotted salamanders as a habitat quality issue in need of additional restoration management. I used population viability analysis to project the probability of persistence of reintroduced spotted salamanders and wood frogs under several scenarios. Population models aided in the development of a reintroduction plan and in the evaluation of the probability of persistence of spotted salamanders and wood frogs released into MWFP. Finally, I examined the

developmental impacts of emodin, a metabolite produced by the invasive shrub, European buckthorn, on the development of amphibians using the FETAX protocol. Emodin produced amphibian embryo malformation and mortality at ecologically-relevant concentrations. This experiment identified a potential threat to the persistence of pond-breeding amphibians in areas where European buckthorn has become established.