

Public Abstract

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Title:Building better wetlands for amphibians: Investigating the roles of engineered wetland features and mosquitofish (*Gambusia affinis*) on amphibian abundance and reproductive success

Efforts to replace natural wetlands lost to development with constructed wetlands have been criticized for failing to replace lost habitat, even with net area gains. Of particular concern is the suitability of constructed wetlands as habitat for threatened animals. Habitat loss is a primary reason for amphibian declines so it is imperative that constructed wetlands significantly contribute to amphibian conservation.

I surveyed amphibians in 49 constructed northern Missouri wetlands to investigate influences of wetland design and placement on amphibian abundance. Features associated with open water ponds best explained abundances of commonly captured species. Salamanders and most treefrogs were rarely captured and responded positively to aquatic vegetation, but negatively to fish and human disturbance-related terrestrial habitat features. I also tested design and mosquitofish (*Gambusia affinis*) effects on amphibians in 18 experimental constructed wetlands. Mosquitofish reduced the number of frog species in wetlands, the number of tadpoles of some species, and the number of juveniles emerging from wetlands. Mosquitofish also caused tadpole tail injuries. Further, mosquitofish reduced the the number and variety of aquatic insects and other invertebrates. Aquatic vegetation and shallow within-water slopes also bolstered abundances of some frogs, and aquatic vegetation increased the number of frog and invertebrate species.

My research indicates that constructed wetlands can be effective for amphibian conservation if appropriate habitats for target species are provided at both the design and placement levels. Fish-free, heavily vegetated, shallow-sloped wetlands, placed in landscapes with low human disturbance, appear to provide the best habitat for uncommon amphibian species.