Diversity and Habitat Associations of Pool-breeding Amphibians of Constructed Temporary Wetlands and Stream-connected Floodplain Pools in North Mississippi

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Abstract: Several studies have proposed creation of artificial, seasonal wetlands for ensuring habitat diversity and providing connectivity for amphibian populations. Few published studies, however, have addressed differences in faunal communities between constructed and natural wetlands. We quantified amphibian species richness, abundance, and community similarities among four isolated, upland ephemeral pools constructed as water sources for livestock/wildlife species (>40 years ago) and six stream-connected floodplain pools. We used pitfall-funnel surveys along drift-fence arrays for 37 trap periods over a five-year period. Seventeen amphibian species (9,072 individuals) were captured at upland sites and 15 amphibian species (2,070 individuals) were captured at floodplain sites. Approximately 48% of the amphibian community differed between upland and floodplain pools. Total amphibian abundance, anuran richness and abundance, and captures of mole salamanders, central newts, and eastern spadefoot toads were significantly greater in constructed upland pools compared to natural stream-connected floodplain pools. Mean pool depth was the strongest predictor of amphibian richness and abundance. Negative associations were also found for overstory species diversity and mean diameter of downed woody debris. Many of the species exhibiting these associations were correlated with upland pools. Differences in hydrologic regime and presence of fish predators may have accounted for floodplain pools being less diverse for pool-breeding amphibians. This study's results show the propensity for colonization of constructed ponds and value of these ponds for amphibians in upland forests. Thus, we submit that protection of upland and floodplain ephemeral pools is necessary to protect the diversity of amphibians on public lands in north Mississippi.

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