

SPATIO-TEMPORAL VARIATION IN DISTRIBUTION OF AQUATIC SPECIES AND THEIR HABITATS IN A RESERVOIR TRANSITION ZONE

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Dams convert riverine habitat to a series of reaches or zones where differences in flow, habitat, and biota, both downstream and in reservoirs, are obvious and well described. At the upstream extent of a reservoir, however, is a transitional reach or zone that contains characteristics of riverine habitat both in the upper reservoir and in tributaries connected to the reservoir. The total amount and quality of habitat within the transition zone depends on characteristics that vary greatly both seasonally and on shorter, often unpredictable time scales depending on dam operation and a combination of weather and climate. Relatively little is known about the persistence and resilience of biological communities in the transition zone. The Lewis Smith development impounds several major headwater tributaries in the Black Warrior River watershed, including two large tributaries flowing through the Bankhead National Forest in north Central Alabama: Sipsey Fork and Brushy Creek. Water levels upstream of the Lewis Smith development fluctuate seasonally up to 6 m and are highest in early spring and lowest in late fall or early winter. The watershed upstream of the Lewis Smith development is home to extremely diverse biological communities with at least 69 fish, 18 mussel, and 6 crayfish species, counting native, introduced, and exotic species, several of which are restricted to the Black Warrior River drainage or are species of conservation concern. Beginning in 2012, we partnered in a multi-year effort to describe habitat conditions and biological communities within transitional habitats in the Sipsey Fork and Brushy Creek watersheds. Overall project objectives are to: 1) delineate the extent and physical characteristics (structure, sediment, etc.) of transition zone and sub-zone habitats during both full and minimum pond levels, 2) describe the distribution of fish, crayfish and mussel species with an emphasis on Federal and State Threatened and Endangered species, and 3) assess the role of tributaries as refuge habitats. Fish, mussel, and crayfish distributions in Sipsey Fork and Brushy Creek appear to be related to habitat zones (impounded, transition, stream) and subzones (stream-run, run-impounded). In general, the transition zone functions as an ecotone, with the highest overall species diversity. Within the transition zone we collected species associated with river, stream, and headwater habitats more frequently from the stream-run subzone than the run-impounded subzone. Impounded and transitional habitats also function as pathways for upstream invasion by non-native fish, mussel, and crayfish species introduced into Lewis Smith reservoir.

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