

Abstract

The Behavioral Carrying Capacity (BCC) technique was used to test the assumption of the Instream Flow Incremental Methodology (IFIM) that a positive linear relationship exists between fish habitat (Weighted Usable Area or WUA) and fish biomass for smallmouth bass populations at carrying capacity. BCC experiments were performed at various streamflows and WUA was measured at each flow. In each BCC experiment, a section of a stream was over-stocked with juvenile smallmouth bass *Micropterus dolomieu*, excess fish were trapped as they emigrated, and the remaining resident fish were collected after a 10-day period. I found negative relationships between WUA and BCC, and between stream discharge and BCC. High BCC values that occurred during low-flow experiments resulted from less upstream and downstream movement by juvenile smallmouth bass. Such behavioral changes may prevent smallmouth bass populations from being limited by habitat availability during low-flow events. The low-velocity nature of many warmwater streams, and the diverse aquatic habitats and fish communities they contain, are quite different from the high-velocity trout streams where IFIM was developed. As a result, fish populations in warmwater streams are often structured by mechanisms other than habitat availability. In such cases the microhabitat variables (depth, velocity, substrate and cover) typically used in IFIM studies may be inadequate for predicting fish population responses to streamflow alteration for many species and lifestages of fish in warmwater streams.