

COMPARISON OF PREDICTED HABITAT CHANGE AND BENTHIC MACROINVERTEBRATE  
RESPONSE TO A SIMULATED IRRIGATION WITHDRAWAL IN HUNT CREEK, MICHIGAN

ABSTRACT

We diverted approximately 50% of the summer stream flow from a 0.7 km section of Hunt Creek from June 1-August 31, 1992-94 to simulate the impacts of flow withdrawal for irrigation on the benthic macroinvertebrate assemblage. We also simulated the impacts of the withdrawal on the benthic macroinvertebrate habitat in the treatment section by use of the Physical Habitat Simulation System (PHABSIM), and compared the changes in habitat with observed densities of benthic macroinvertebrates in the treated section of Hunt Creek. We developed habitat suitability criteria (HSC) from benthic macroinvertebrate samples collected in the treated section of Hunt Creek. The withdrawal of 50% did not decrease the benthic macroinvertebrate habitat of most of the taxa examined, but did reduce habitat of riffle dwelling taxa (e.g. Heptageniidae) by up to 38%. The total density of benthic macroinvertebrates in the treatment section of Hunt Creek did not change as a result of the reduced flow in relation to the total density of benthic macroinvertebrates in a control section. However, the densities of Heptageniidae in a riffle sampled in 1994 did decrease in relation to a control riffle ( $p=0.05$ ), indicating that reduced flow may have resulted in a reduction of Heptageniidae density.

Introduction

The Physical Habitat Simulation System (PHABSIM) is the computer based habitat modeling component of the Instream Flow Incremental Methodology (IFIM) developed by the U.S. Fish and Wildlife Service that models stream physical habitat as a function of discharge (Milhous et