

MACROINVERTEBRATE AND CRAYFISH COMMUNITY  
DISTRIBUTION OF THE MERAMEC RIVER DRAINAGE BASIN: AN  
INVESTIGATION AT MULTIPLE SPATIAL LEVELS

Kristi Williams

Dr. Charles Rabeni, Thesis Supervisor

ABSTRACT

Hierarchical classification systems have been widely used to delineate terrestrial ecounits at multiple spatial scales; however there has long been a need for an aquatic based classification system. A newly developed aquatic ecosystem classification system was tested using crayfish and macroinvertebrates at multiple spatial scales. Benthic macroinvertebrates were sampled from twenty-seven sites from three Aquatic Ecological System (AES) Types in the fall of 2001. Macroinvertebrate (MI) assemblages were tested for within- and between-Type similarities. DCA ordinations and similarity analyses showed that MI assemblages were more similar within AES Types than between AES Types. Regression analyses indicated that assemblages were related to large scale factors indicative of AES Type boundaries.

Crayfish were sampled from the same twenty-seven sites from four habitat units (riffles, runs, backwaters, and vegetation plots) in fall 2001. Crayfish communities were similar within run and riffle habitats of the same AES Type and were similar within backwater and vegetation plots of the same AES Type.

Crayfish correspondence to Valley Segment Type (VST) was related to stream size. Crayfish were captured from run habitats within three stream size classes in three

neighboring watersheds in the summer of 2002. *O. luteus* dominated small-rivers, *O. punctimanus* dominated headwaters, while *O. medius* dominated creeks.

Longitudinal distribution of crayfish was examined in summer of 2002. Crayfish were sampled from four stream sizes from headwater to big-river. Mean density of crayfish was greater in headwater and creek streams than in small- and big-river sites. Mean YOY crayfish capture was greater than adults for all species in all stream sizes.

Crayfish sampling gear was tested in the summer of 2002 and 2003 for adult and YOY crayfish age classes. The semi-quantitative kick seine used in this study was compared to a quantitative quadrat sampler. The quadrat sampler consistently captured more individuals than the kick seine, but not in a predictable manner. Regression analyses showed high variability and low correlation between the quadrat and either seine method for both years and in all age classes.