EFFECT OF SMALL DAMS ON FRESHWATER MUSSEL POPULATION GENETICS IN TWO SOUTHEASTERN USA STREAMS

Erin Abernethy

Department of Biology, Appalachian State University 572 Rivers St., Boone, North Carolina 28608 U.S.A.

current: Odum School of Ecology, University of Georgia 140 E. Green St., Athens, Georgia 30602 U.S.A.

email: efabernethy@gmail.com

Erin McCombs, Lynn Siefferman, Michael Gangloff

Department of Biology, Appalachian State University 572 Rivers St., Boone, North Carolina 28608 U.S.A.

ABSTRACT

The global imperilment of freshwater mussels is strongly linked to widespread habitat destruction by dams, but more subtle mechanisms by which dams impact mussels are not well studied. For example, dams fragment populations in free-flowing reaches, potentially leading to low survival probability due to genetic effects, but few studies have addressed the genetic effects of fragmentation on mussel populations. We examined patterns of genetic variation in the mitochondrial CO1 and ND1 genes in populations of two mussel species that were fragmented by >175 y old small dams. We found that only a few rare haplotypes were restricted to reaches either upstream or downstream of the dams, and an array of genetic parameters showed little differentiation among upstream and downstream reaches. These results can be interpreted in one of two ways. First, gene flow across these dams may remain high, resulting in little genetic fragmentation. Alternatively, the apparent lack of population differentiation could be a historical artifact of high, pre-dam gene flow, and the genetic markers we used may not yet reflect relatively recent population isolation.

KEY WORDS stream; dam; conservation; biodiversity; invertebrates