

## STATUS OF FRESHWATER MUSSELS IN THE MIDDLE FORK HOLSTON RIVER, VIRGINIA

**William F. Henley**

Freshwater Mollusk Conservation Center, Department of Fish and Wildlife Conservation  
100 Cheatham Hall, Virginia Tech, Blacksburg, Virginia 24061 U.S.A.  
whenley@vt.edu

**Michael J. Pinder**

Aquatic Operations, Virginia Department of Game and Inland Fisheries  
2206 South Main St., Suite C, Blacksburg, Virginia 24060 U.S.A.

**Brian T. Watson**

Aquatic Operations, Virginia Department of Game and Inland Fisheries  
1132 Thomas Jefferson Road, Forest, Virginia 24551 U.S.A.

**Richard J. Neves**

Department of Fish and Wildlife Conservation, Virginia Tech  
Blacksburg, Virginia 24061 U.S.A.

### ABSTRACT

Six sites in the Middle Fork Holston River (MFHR), Virginia, were surveyed in 2010 and 2011 using catch-per-unit-effort (CPUE, no./h) and 0.25 m<sup>2</sup> quadrats to assess changes in the mussel fauna since a previous survey in 1998. Since 1998, species richness declined from 15 to 11, compared to a historical richness of at least 20 species. To date, extirpated species are dominated by short-lived species, but all remaining species are declining rapidly. Mussel abundance, both as density (number/m<sup>2</sup>) and CPUE, declined by ≥50% since 1998 at most sites, and several species collected during this study were represented by only a few individuals. There was no evidence of recent reproduction at the survey sites. Although the federally endangered *Epioblasma florentina aureola* appears to be extirpated, two species proposed for federal listing, *Pleuronaia dolabelloides* and *Ptychobranhus subtentum*, persist in the river. The MFHR appears to be another example of an enigmatic mussel decline characterized by curtailed recruitment and subsequent erosion of the fauna over time, despite a lack of obvious impacts to the stream. Twenty-six reaches in the MFHR watershed are listed as impaired, primarily by sediment and *E. coli*, suggesting that nutrient enrichment coupled with increases in streambed embeddedness could produce elevated substrate ammonia concentrations, which are toxic to juvenile mussels. In addition, limited sediment quality data indicate that metals, PCBs, and DDE are present in the stream and also may inhibit recruitment or have sublethal effects on adult mussels. The MFHR is an important refuge for the diverse Tennessee River basin mussel fauna, and identification and remediation of specific factors responsible for mussel declines are urgently needed.

**KEY WORDS** Freshwater mussels, Unionidae, Middle Fork Holston River