VERTICAL MIGRATION AND REPRODUCTIVE PATTERNS OF A LONG-TERM BROODING FRESHWATER MUSSEL, *VILLOSA CONSTRICTA* (BIVALVIA: UNIONIDAE) IN A SMALL PIEDMONT STREAM

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ABSTRACT

We delineated a permanent 15 m by 9 m reach of a mussel bed in a small piedmont stream in the Cape Fear River Basin of North Carolina, USA. A total of 14 surveys were conducted at the study site from May 2005 to September 2006 at time intervals ranging from 2 weeks to 3 months. The study area was divided into fifteen 1-m-wide transects, and each transect was thoroughly searched twice during each survey event for any mussels on the substrate surface. We recorded species identification, length, gravidity (for known females) and replaced the mussel in the exact spot it was found. A pilot study was conducted to determine detection success with one, two, and three passes per transect and detection success was monitored on all transects throughout the study. We estimate that two passes over these transects yielded approximately 90% of the mussels on the sediment surface. Vertical migration patterns of *Villosa constricta*, and in particular females, were highly seasonal. Additional within-season variation could not be explained by seasonal patterns alone. Larger individuals were recaptured more frequently. Female mussels became gravid from August through March indicating that spawning and glochidial release took place over an extended period. In 2005, glochidial release was 1-2 months later than in 2006 and lasted through June. In 2006, glochidial release began before 7 February in 2006 and lasted through April. Smaller *V. constricta* (23-28 mm) were more likely to be gravid, and about half of the individual females were observed to spawn in consecutive years.

KEY WORDS burrowing, surveys, spawning, reproductive timing, glochidial release