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A Survey of the Freshwater Mussel Fauna in Hunting Run, Spotsylvania County, Virginia

Technical Report to:

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Introduction

Spotsylvania County is currently seeking to develop additional water supplies. Hayes, Seay, Mattern and Mattern, Inc.(HSMM) of Virginia Beach has been contracted to prepare an environmental assessment of a proposed reservoir on Hunting Run, a Rappahannock River tributary in eastern Spotsylvania County. HSMM requested Philip H. Stevenson to undertake a survey of Hunting Run to determine the presence of dwarf wedgemussel (*Alasmidonta heterodon*) and other freshwater mussel species in Hunting Run.

Methods

Hunting Run in Spotsylvania County, Virginia was surveyed for the presence of rare freshwater mussels. The survey focused on the dwarf wedgemussel (*Alasmidonta heterodon*), a federal and state listed endangered species. The area surveyed extended from the mouth of Hunting Run upstream to the 250 foot contour. Figure 1 indicates general survey sites within the overall survey area. This figure is a selected portion of the Chancellorsville, Virginia U.S. Geological Survey 7.5 minute quadrangle topographic map with annotations.

The dwarf wedgemussel largely uses habitats of slow to moderate flowing streams with gravel, sand, or muddy sand substrate (Clark and Berg, 1959; Johnson, 1970; Michaelson, 1993). Intensive searching was limited to those areas of habitat which resembled the preferred habitats. Survey methods included waterscoping, handpicking, and raking the substrate. Substrate raking was typically limited to sand and gravel substrates. In addition, stream banks were searched for muskrat middens of discarded shells and shells cast on bars by flood. Field surveys occurred on October 10, October 18, and October 27, 1993. Philip H. Stevenson conducted the field survey. Voucher specimens will be deposited in the Virginia Museum of Natural History, Martinsville, Virginia.

Results

One mussel species, the Atlantic spike (*Elliptio producta*), occurred in the survey area. This mussel was very uncommon with only 3 specimens found at widely separated sites. The text which follows describes the general survey sites depicted in Figure 1. These sites are identified by the numerical label displayed in Figure 1.

Site 1 was the downstream-most area investigated. This area was the fastest flowing, characterized by cobble and bedrock substrate. The stream was generally under one meter wide where flowing. Depth was very shallow in these riffles, less than 0.1 meter deep. Intermingled with riffles were small pools, circa 3-5 meters wide and 0.3 to 0.5 meters deep. The pools often contained gravel and sand substrates, frequently overlying bedrock. Site 1 terminated in its upstream end with a relatively long pool at a sharp bend in Hunting Run.

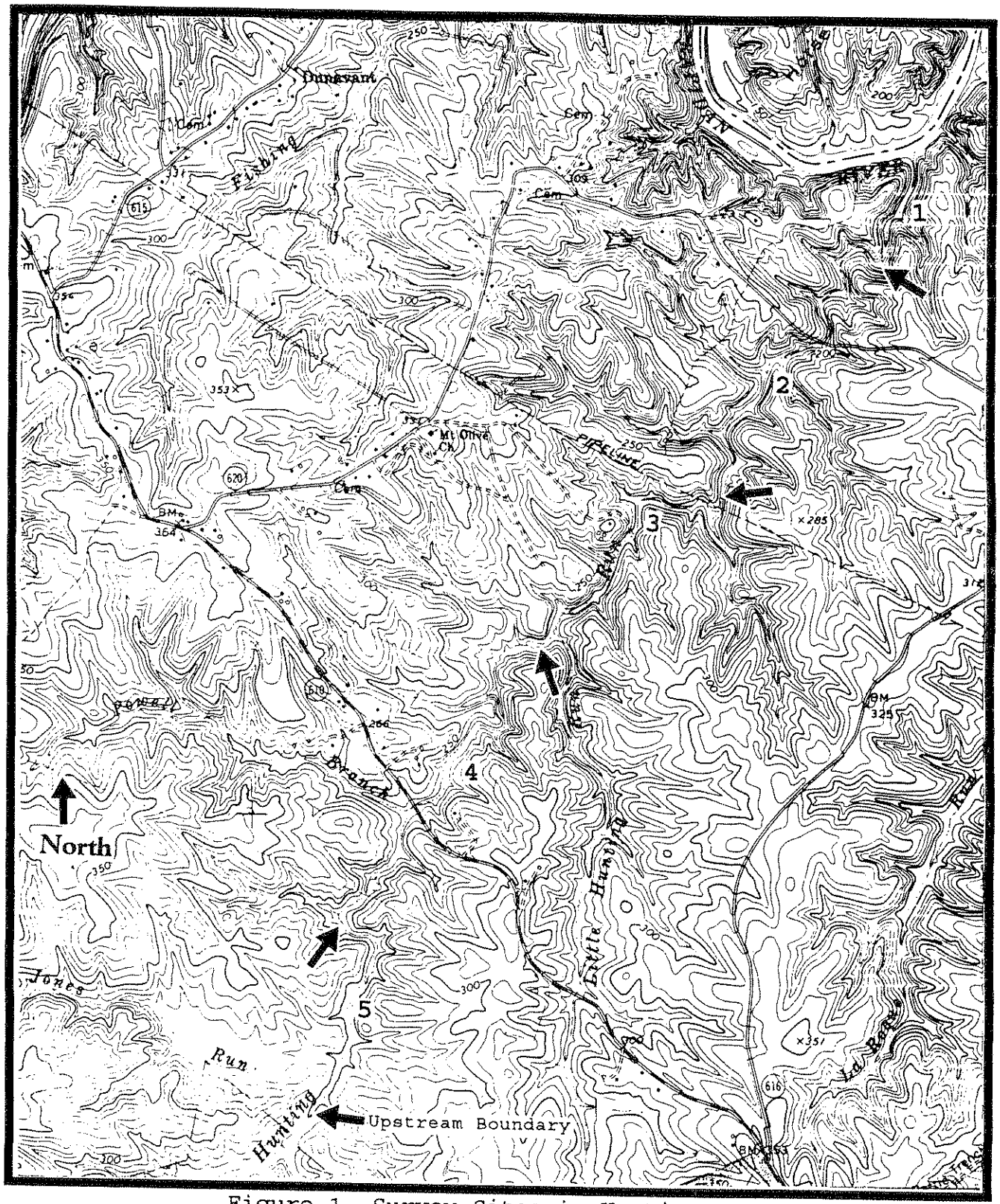

Figure 1. Survey Sites in Hunting Run, Spotsylvania County, Virginia (arrows indicate site boundaries)

One live immature specimen of *Elliptio producta* was collected in this area. It was the only freshwater mussel observed here. Other mollusks observed included fingernail clams (family Sphaeriidae) and the exotic clam *Corbicula fluminea*. Both fingernail clams and *Corbicula* clams were moderately common. Fish were also present, including *Etheostoma* darters. Two species of *Etheostoma* have been shown to serve as hosts of dwarf wedgemussel glochidia (Michaelson, 1993). I found no pleurocerid snails. These snails tend to be indicators of good water quality in my observations. While the stream seemed to be in good condition, the high gradient habitat with small areas of appropriate substrate make this area generally unsuitable dwarf wedgemussel habitat.

Site 2 extended from above Site 1 to roughly 50 meters downstream of a pipeline crossing. Site 2 is typified by a much lower gradient than Site 1. The substrate tends to be pebble and cobble in shallow, narrow riffles. These riffles are under 1 meter wide and less than 0.1 meter deep. This section probably had a mix of riffles, slow run habitats, some pool habitat, and transition areas between the various habitat types; however, beavers have greatly modified the stream habitats. Five beaver dams were found between Route 620 and the downstream end of Site 2. There were four more beaver dams upstream of Route 620 within Site 2. These dams impounded the majority of the stream in pools which are 3-5 meters wide and 0.5 to 1.0 meters deep. These pools frequently are well-silted or have accumulations of organic matter. From the vegetation of the riparian areas, it appears that the beavers have been in Hunting Run for several years. There were few hardwood saplings; and, larger hardwoods were noticeably thinned. I observed few fresh stumps close to the stream.

In this area, fingernail clams and *Corbicula* clams were found. No freshwater mussels were observed. Also, no pleurocerid snails were found. Due to the pooled nature of the stream, this area appears to be generally unsuitable in its present state for dwarf wedgemussel.

Site 3 is a higher gradient section than Sites 2 or 4. This section includes Hunting Run from the pipeline crossing upstream to 100 meters above the confluence with Little Hunting Run. The stream is generally narrower than in Site 2, generally 1-3 meters wide. The dominant habitat is generally lotic with shallow runs and riffles predominate. Hunting Run is very shallow here, with water rarely over 0.1 m deep. The substrate tends to be pebble and gravel in the run-like areas. Riffles have cobbles and some small boulders present. A large pasture abuts the stream for several hundred meters above the pipeline crossing. Hunting Run adjacent to this pasture was distinctly siltier than the further downstream or upstream areas.

In this area no freshwater mussels were found. Fish were very uncommon. Fingernail clams were not found nor were *Corbicula* clams. No pleurocerid snails were found. Overall, the fauna was very poor here.

Little Hunting Run enters Hunting Run within this survey area. On the day this area was surveyed, no flow entered Hunting Run from

Little Hunting Run. Little Hunting Run is a small stream, circa 1 meter wide with water depth much less than 0.1 meter. This stream is not a potential habitat for mussels.

Site 4 was similar to Site 2. Beavers have extensively modified this area, especially downstream of Route 610. The stream was 3-5 meters wide. Where unimpounded, the stream had small flowing sections, 1-2 meters wide and 0.1 meter deep. The substrate tended to be gravel and pebble in the flowing areas. Pools frequently had a silt or organic layer overlying a coarser gravel/pebble substrate. Seven beaver dams were observed in this section. In addition to beaver dams, some scattered bedrock ledges upstream of Route 610 created pools also.

Shells of two *Elliptio producta* were found near the upper boundary of this site, adjacent to Hunting Run's confluence with an unnamed tributary. These were the only mussels found in this site. Fingernail clams were found here; however, *Corbicula* clams were not. No pleurocerid snails were found. Fish species observed included *Etheostoma* darters and mosquitofish.

Powell Run enters Hunting Run within this section. Powell Run is a very small stream, ca. 0.5-0.8 meter in width and roughly 0.1 meter deep at its mouth. It is not a significant mussel habitat.

Site 5 was the upstream-most area investigated. This area extends from the upper boundary of Site 4 to the 250 foot contour. Hunting Run had a higher gradient here than in Site 4. The stream narrowed here also. The stream bed was between 2-3 meters wide; however, the bed actually occupied by water was generally smaller. Small, shallow pools, roughly 1-2 meters wide and 5-10 meters long, were separated by very narrow flowing segments. The flowing areas were under 1 meter wide and less than 0.1 meter deep. The substrate in pools was generally a sand and gravel mix with an overlying silt and organic layer in the quietest sections. In general, the substrate was coarser here than downstream, especially in the flowing areas. Cobbles and small boulders were more common. Within the uppermost 300 meters of this search area, the stream was reduced to small rivulets, 0.2-0.3 meters wide connecting scattered pools of 1-2 meter width and length. The substrate here was generally small boulders and cobbles with interspersed pebble and gravel.

No mussels, fingernail clams, or *Corbicula* clams were found. No pleurocerid snails were seen. Mosquitofish (*Gambusia affinis*), were the only fish seen. Mosquitofish are tolerant of poor water conditions and are typical of pool environments.

Discussion

Hunting Run contains a small population of one mussel species, the Atlantic spike (*Elliptio producta*). Only three specimens were found; however, one was an immature specimen circa 10 mm long indicating recent reproduction. The Atlantic spike is typical of slow water. Observations support that pool habitats are the predominate type; the Atlantic spike specimens were all associated with pool habitats. These pools are probably the permanent water

habitats of the majority of Hunting Run. The riffle/run habitats which remain are quite small and shallow, probably too small to support mussels. Fingernail clams and *Corbicula* clams where found only in pools which supports the idea that the lotic habitats of Hunting Run are poor. Pleurocerid snails tend to be indicators of good habitats with flowing water in eastern Virginia. These snails were absent. This supports the contention that the stream habitats are not appropriate for a sensitive species like the dwarf wedgemussel. Also, the preponderance of beaver impoundments further reduces the likelihood of dwarf wedgemussel. This species prefers water with some flow. Where the dwarf wedgemussel occurs in pools, the pools are typically lotic habitats during average to high flow conditions (Michaelson, 1993).

The generally reduced fauna of Hunting Run may have to do as much with historical impacts as current ones. This area was undoubtedly farmed in the past and those land use practices may have had some serious affects on the stream fauna. The one active pasture which abuts the stream has a noticeable affect on the amount of silt in the stream. Taken together with the relatively high gradient of parts of the stream, recolonization would be difficult once a mussel population was extirpated. It is not surprising that a species which seems to be relatively tolerant of pools and muddy conditions is the only one revealed to be present.

Summary

One species of freshwater mussel was found. Three specimens of the Atlantic spike, *Elliptio producta*, were found. Hunting Run generally has fair to good conditions; however, beavers have altered the stream greatly, impounding large sections of it. Much of the riffle or run habitat is eliminated. Altogether, I believe this means that Hunting Run is not an appropriate habitat for the dwarf wedgemussel.

References

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