FINAL REPORT:

SURVEY OF TRIBUTARIES IN SOUTHWESTERN VIRGINIA FOR FRESHWATER MUSSELS OF THE UPPER TENNESSEE RIVER BASIN

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DECEMBER, 1992

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INTRODUCTION

The freshwater mussel fauna of the Tennessee River drainage system of Virginia has been extensively surveyed and monitored for decades. Drastic changes in community compositions and abundances of individual species have resulted in an ecological alarm sounding throughout the scientific community. Decades of pollution and improper land management threaten this environmentally sensitive group, as well as aquatic life as a whole, in many streams of southwest Virginia. Historical data, however, indicates that survey and collection efforts have been focused on the mainstems of major streams: Powell, Clinch, North Fork Holston, Middle Fork Holston, and South Fork Holston Rivers. Other than a few very large streams, little has been reported on the surveying efforts or findings of mussels in tributaries of these major rivers. Interest in tributaries has been growing among malacologists, although investigations of these waters are lacking.

During the summer field season of 1992, tributaries to the major streams of the Tennessee River basin in Virginia were visited and assessed for evidence of mussel presence and availability and quality of mussel habitat. The objective of this survey was to locate possible populations of threatened and endangered mussels (as well as other, more common species) that had not previously been reported from these small to medium size tributaries. Potential mussel populations identified in this portion of the study should be revisited and surveyed more thoroughly, using snorkeling gear to locate mussels.

METHODS

All tributaries of major rivers within the Tennessee River drainage of Virginia were considered in this study. Topographic maps were used to locate tributaries. Streams that were considered too small to support mussels were not surveyed. Streams that were deemed large enough to warrant investigation were visited and evaluated visually for habitat quality. Stream selection was subjective, however, and those waters excluded from the survey are not necessarily without mussel populations. Factors considered in the field evaluation included substrate composition and expanse, stream size, habitat quality and degradation, presence of mussel shells, land use practices near and upstream of the location, and presence of fish species. Banks and shallow areas were investigated for mussel shells, using a waterscope when necessary. Gravel bars, when present, were thoroughly searched.

POWELL RIVER TRIBUTARIES:

Roaring Fork - Location: upstream from Rt 603/ Hwy Alt 58 junction; 4 miles W of Norton, Wise Co. Sept 22 '92.
· Small bridge 100 m upstream of Alt 58 crossing - Low mussel potential. Medium-sized creek. Pools with bedrock and silt; riffles with boulder and cobble. No shells found. No mussel habitat. One hogsucker seen. Railroad operations along creek may contribute to silt load. Terrain: steep. Riparian: good. Bank vegetation: good. Land use: railroad, road. Photos taken.
· Upstream of previous site about 1 mile, road still on west side of creek - Low mussel potential. Medium-sized creek. Substrate a mix of silt, gravel, and cobble; some sand and boulders. Stream characteristic of headwater: rhododendron/hemlock along banks; moss covered boulders in stream. Habitat doesn't look right for mussels. A lot of silt present. No shells found; waterscope used. No fish seen. Strip mining just upstream: likely contributor of silt. Riparian: good. Bank vegetation: good. Terrain: steep. Railroad alongside creek. Land use: railroad, road. Photos taken.
· Upstream of previous site, next to a strip mining operation - Low mussel potential. Stream characteristics same as previous site, but no hemlocks. No mussel shells found. Land use: railroad, mining, road. Photos taken.
· Upstream of previous site; railroad crossing about 1.5 miles upstream of Alt 58 - Low mussel potential. Medium-sized creek. Mostly gravel and sand here. Substrate still not right for mussels: gravel is all rounded and large. Many riffles. Searched gravel bars for shells, but found none in or out of water. Very silty. School of Notropis seen. Terrain: steep. Bank vegetation: good. Riparian: good. Land use: road, railroad. Photos taken.
Note: Roaring Fork appeared to be characteristic of a trout stream at all sites. No aquatic vegetation seen anywhere.

Wildcat Creek - Location: Tributary to South Fork of Powell, 2 miles S of Big Stone Gap, Wise Co. Sept. 23 '92.
· Railroad overpass on Rt. 609, near East Stone Gap - Low mussel potential. Small creek. Habitat fair, with small to large gravel present, but stream is very small and not likely to support mussels. Terrain: steep on one side, moderate on other. Bank vegetation: good. Riparian: good on one side, poor on other. No shells found.
· Upstream of previous site; Rt 609 crossing at Rt 668 junction - Low mussel potential. Small creek. Findings same as previous site. Marginal substrate, but stream too small for mussels. No shells found. Photo taken.
· Between previous sites; on Rt 668 at railroad crossing N of Rt 609 junction - Low mussel potential. All flat bedrock. Stream is just a trickle; water must sink somewhere upstream. No shells found.

South Fork of Powell - Location: E of Big Stone Gap, Wise Co. Sept 23 '92.
· Rt 612 crossing at junction with Rt 616 - Moderate mussel potential. Moderately small creek. Substrate marginal for mussels, but has fine to large gravel and cobble. Hogsucker and minnows seen. Silt covers much of the bed in pools, but is not bad in flowing areas. Riparian: poor. Bank vegetation: good. Land use: residential, highway, and crops. Terrain: moderate to flat. No shells found. Photos taken.

Callahan Creek - Location: along Hwy 78 N of Appalachia, Wise Co. Sept 23 '92.
· In Appalachia under Alt 58 bridge, just above mouth - Low mussel potential (pollution and substrate composition). Moderately large creek. Substrate of rounded gravel and small rubble. Little small gravel/sand present. Shallow. Moderately silty. Abundance of algae on rocks; leachate in some areas. Looks and smells polluted. Hogsuckers and minnows seen, other groups likely present; saw one fish with fungus and another with a lesion. Also found one dying crayfish. Searched large area of stream and many gravel bars, but no shells found. Land use: highways, roads, commercial; mostly paved. Riparian: poor. Bank vegetation: poor. Terrain: flat to moderate. Photos taken.
· Upstream of previous site; railroad track at mouth of Mud Lick Creek - Low mussel potential. Stream characteristics similar to previous site. Much more silt, less algae. No mussel shells found. Minnows seen. Land use: highway, railroad. Photos taken.
· Upstream of previous site; just upstream of Stonega on Rt 600 - Low mussel potential. Medium-sized stream. Substrate includes boulders, as well as large pieces of concrete. Concrete walls line several sections along this stretch. Piles of coal fines along stream. No mussel shells found. Land use: railroad, road. Bank vegetation: good. Riparian: good on one side, poor on other. Still a lot of silt. Photos taken.
Note: Pollution to stream is likely due entirely to coal mining/handling/transport operations. Mining communities and mining rescue station are located along stream. Railroad parallels stream, with a coal loading station. Many piles of coal fines along stream. Most visible effects (silt, discoloration, coal) are concentrated in upper portion of creek, but are apparent all the way to Appalachia.

Mud Creek - Location: Rt 622 near Seminary, Lee Co. Sept. 23 '92.
· Section along Rt 622 from Hwy Alt 58 to 1/2 mile upstream of Rt 621 bridge - Low mussel potential. Small creek. Substrate almost entirely mud; not much rock. Land use: road, pasture. Riparian: poor/fair. Bank vegetation: poor in most places. No shells found.
· Section from 1/2 mile upstream of Rt 621 bridge to mouth - Low mussel potential. Medium-sized creek. Substrate almost entirely boulder, rubble, and large gravel broken from bedrock outcrops; no finer substrate. No mussel habitat. No shells found. Land use: road, pasture. Riparian: poor. Bank vegetation: poor. Photos taken.

Looney Creek - Location: along Hwy 160 W of Appalachia, Wise Co. Sept 23 '92.
· Upper powerline crossing, 1/4 mile from Kentucky line - Low mussel potential. Moderately small stream. Heavily polluted: strong sulphur odor in air (definitely from stream); white precipitate covers rocks in stream; odd algae(?) growths; no fish seen. Snails present. No mussel shells found. Substrate of rounded gravel and rubble. Ford in stream here. Land use: highway. Bank vegetation: good. Riparian: poor. Terrain: moderate to steep. Source of pollution unknown. Photo taken.
· Downstream of previous site; footbridge at Equal Opportunity housing - Low mussel potential. Medium-sized creek. Trout stream characteristics. Rounded cobble to gravel. Silt in pools. No mussel shells found. Bank vegetation: good; Riparian: poor. Terrain: moderate to steep. Photo taken.

Pigeon Creek - Location: along Hwy 68 NW of Big Stone Gap, Wise Co. Sept 23 '92.
· Railroad crossing over creek alongside highway, about 1/2 mile from mouth - Low (to moderate) mussel potential (low due to silt, pollution, and no fish seen). Medium-sized creek. Substrate looks good: mix of sand and small gravel filling spaces between gravel and cobble; some boulder. Problem: a lot of silt in pools and glides. Quite a bit of algae too. Only swift riffles free of silt and algae; habitat looks good in these areas, though small. No fish seen. Bank vegetation: good. Riparian: fair. Land use: residential, railroad, highway. No shells found. This looks like a much more likely mussel stream than Looney, Callahan, Roaring Fork, or upper Powell. Photos taken.
· Upstream of previous site; Rt 810 turnoff and bridge - Low mussel potential. Problems and land use similar to previous site, but no mussel habitat here. No shells found. Cascading riffles of cobble and boulder upstream, silted-in pool with boulder and cobble downstream. Riparian: poor. Photos taken.
Note: stream more "trouty" upstream of these sites. Substrate is larger, with boulder being dominant. Channel is narrow, as a headwater. Photo taken.

Beaverdam Creek - Location: Tributary to South Fork of Powell, 2 miles E of Big Stone Gap, Wise Co. Sept. 23 '92.
· Rt 613 bridge crossing - Low mussel potential. Small creek. Substrate entirely mud. No shells found.

Jones Creek - Location: Tributary of North Fork Powell; along Rt 606, NE of Pennington Gap. Sept 25 '92.
· At Rt 628 crossing near mouth - Low mussel potential. Small creek. Shallow. Very silted, discolored. Polluted. Substrate of gravel and finer materials; little cobble. No shells found on gravel shore or in water. Does not look like good mussel habitat, though there is plenty of gravel and finer materials. Pollution problem makes mussel presence very unlikely. Terrain: moderate. Bank vegetation: fair. Riparian: poor. Land use: road, residential. Photos taken.

Martin Creek - Location: Rose Hill, Lee Co. Sept 24 '92.
· First bridge on Rt 672 downstream of Hwy 58 - Low mussel potential. Medium-sized creek. Substrate of rubble, boulder, and bedrock mixed with fine gravel. A lot of silt, covering much of the bed and much of the exposed rock surfaces. Minnows seen. Signs of significant groundwater influence: watercress growing in middle of stream; much of exposed rock surface underwater covered with moss; silt looks like it may be from springs. Terrain: steep on one side, moderate on other. Land use: residential, road, tobacco. Bank vegetation: fair. Riparian: good on one side, fair on other. No shells found. Snails were present. Water felt cold (spring influence). Photos taken.
· Downstream of previous site; about 1/4 mile downstream of second bridge on Rt 672 downstream of Hwy 58 - Low mussel potential. Medium-sized creek. Similar to previous site, but more bedrock, less rubble and boulder. No watercress. Land use: road, hay and corn fields, residential. No shells found. Photo taken.
· Downstream of previous site; east Rt 671 bridge at Rt 672 junction - Low to moderate mussel potential. Medium-sized creek. Substrate of cobble and lots of fine to medium gravel. Lots of silt, covering much of bed. Clean gravel riffles and runs present. Substrate looks fairly good in clean areas, but the silt/pollution is a problem. Watercress in stream, and some vascular plants and algae. Minnows and possibly a darter seen. Terrain: flat to moderate. Bank vegetation: fairly poor. Riparian: poor. Land use: road, residential, horse pasture. No shells found. Streamside resident who lived here as a child: 60 yrs previous, half-dollar size mussels were abundant; many more species of fish were present than now; now there are probably no mussels in the creek; there are several muskrats in creek downstream. (West Rt 671 bridge at Rt 672 junction just downstream - marginal mussel habitat, but worth coming back to and looking over thoroughly.)
· Downstream of previous site; Rt 672 and Rt 682 junction - Low mussel potential. Much bedrock, but still with fine gravel and silt. No shells found. Most of bed is covered with silt. Land use: residential, road, crops. Photos taken.
· Downstream of previous site; 400 m section upstream of Rt 676 crossing - Moderate to high mussel potential (moderate due to silt problem). Medium-sized creek. Shells found: 3 single valves and 1 entire. Identified by S. Bruenderman as Villosa vanuxemensis. Habitat looks marginal as a whole, with lots of silt/mud in many areas; bedrock dominates some areas; mixture of small gravel and sand is abundant in many areas, along with cobble and boulder. Bank vegetation: fair. Riparian: good on one side, poor on other. Land use: road, residential. Photos taken.
· Downstream of previous site; Rose Hill Baptist Church on Rt 682, just downstream of Rt 676 junction - Moderate mussel potential. Similar stream characteristics as previous site, except substrate mostly bedrock with some gravelly areas; less mussel habitat. No shells found.
Note: Fishes seen at all sites; below the uppermost site, hogsuckers, darters, and sculpins seen in addition to minnows. Designated trout waters (stocked) downstream of uppermost site.

Indian Creek - Location: Far western Lee Co., W of Rose Hill. Sept 24 '92.

· Rt 724 crossing at Ewing - Moderate to high mussel potential. Moderately small creek. Mussel shells found; pea clam shells also present. Identified by R. Neves as Villosa vanuxemensis and Pleurobema oviforme(?). Good mussel habitat, in places, for such a small stream. Substrate of small to large gravel; some cobble and boulder; lots of silt/mud. Land use: highway, commercial, residential. Bank vegetation: poor to fair. Riparian: poor. Terrain: flat to moderate. Darters and minnows seen. Neighborhood boys: they find live mussels regularly; some large shells (6" ?).

· Downstream of previous site; Rt 687 crossing at Cowan Mill - Low mussel potential. Deep, still pool; murky water. Riffles occur about 100 ft downstream. Land use: pasture, road, residential. No mussel shells found. Pea clams shells present.

· Downstream of previous site; upstream Rt 698 crossing near Cowan Mill - High mussel potential. Medium-sized creek. Old mill dam upstream of bridge still intact. Good mussel habitat downstream of bridge; however, cows seen walking in best habitat. Cobble and gravel mixed with fine gravel; not much silt. Could not get out to look for shells (fenced and posted). Fish seen. Land use: road, residential, pasture. Photos taken.

· Downstream of previous site; upstream Rt 690 crossing at Caylor - High mussel potential. Medium-sized creek. Old mill dam still intact upstream. Very good habitat at bridge and downstream. Cobble and gravel with finer materials mixed in. Moderate silt. Found one mussel shell on bank; identified by R. Neves as Villosa vanuxemensis. Pea clam shells very common here, some collected. Land use: road, residential, (pasture?).

· Downstream of previous site; Rt 699 crossing E of Wheeler - Moderate mussel potential. Habitat looks fairly good; no riffles here, though. Water moving slowly; water clear. Did not look for mussel shells.

· Downstream of previous site; Rt 691 crossing at Wheeler - High mussel potential. Large creek. Excellent mussel habitat; should be live ones here. Good mix of gravel, cobble, and boulder, with lots of finer materials filling interspaces; large areas like this. Land use: residential, road, hay field. Terrain: moderate to flat. Bank vegetation: good. Riparian: poor. Did not get in to look for shells (getting late). Photos taken.

· Downstream of previous site; Rt 692 crossing 1 mile N of Tennessee line - Moderate to high mussel potential. Large creek. Old mill dam upstream. Habitat downstream of bridge is fair. A lot of cobble areas with no fine interstitial materials; some areas with fine gravel, though. More silt on substrate here than at previous site. Bank vegetation: good. Riparian: good. Terrain: moderate. One relict mussel shell found (not identifiable); peaclam shells found. Photos taken.

· Downstream of previous site; Rt 693 crossing, 1/2 mile N of Tennessee line - Poor (to moderate) mussel potential. Dam upstream. Substrate of cobble and boulder with very little interstitial material; fine to small gravel areas very limited. Silt is prevalent, present in riffles and pools. No shells found. Land use: road, pasture. Photos taken.

Stone Creek - Location: Tributary to North Fork Powell; along Hwy 421, W of Pennington Gap, Lee Co. Sept 25 '92.
· About 1/2 mile upstream of Hwy 352 turnoff - Low mussel potential. Medium-sized creek. Very rocky; cobble and boulder; smallest rocks are very large gravel and make up a small percentage; no fine materials at all. Murky water. Moderate silt. Looks very "trouty", though rocks are not rounded. No mussel habitat. No shells found. Terrain: steep on one side, moderate on other. Bank vegetation: good. Riparian: good on one side, poor on other. Land use: highway, residential, some business.
· About 1.3 miles upstream of previous site - Low mussel potential. Characteristics same as previous site. No shells found. Land use: residential, highway. Photos taken.

Straight Creek - Location: Tributary to North Fork Powell; along Hwy 352, N of Pennington Gap, Lee Co. Sept 25 '92.
· Adjacent to Rt 636 just upstream of St. Charles, at a condemned wooden bridge - Low mussel potential (due to pollution, lack of good habitat). Small creek. Shallow here. Substrate a mix of large gravel and lesser amount of cobble; rocks rounded. Fine materials present in some areas. Silt and algae cover most of bed. Polluted. No shells found. Minnows seen. Bank vegetation: good to fair. Riparian: poor. Terrain: steep on one side, flat on other. Land use: residential, highway, railroad. Photos taken.
· Downstream of previous site; Hwy 352 crossing in St. Charles - Low mussel potential. Medium-sized creek. Substrate almost entirely gravel beds and bedrock; rocks rounded; some interstitial material. Fairly heavy silt load; signs of pollution. No shells found. Minnows and hogsucker seen. Land use: commercial, residential, highway, railroad. Terrain: moderate. Bank vegetation: fair. Riparian: poor.
· Adjacent to Hwy 352, 1.5 miles downstream (highway miles) from previous site, at railroad stream crossing - Moderate mussel potential. Medium-sized creek. Habitat much better than previous sites. Mix of gravel and cobble, some boulder, with fine interstitial materials. Fair mussel habitat. Algae on rocks. Searched 150 m stretch, with many gravel bank areas; looked in stream from bank along this stretch. No shells found. Looks like there should be mussels or at least shells here. Pollution problem may date far back (lack of shells). Minnows seen. Heavy silt load. Trash abundant. Terrain: moderate to steep. Land use: railroad, residential, highway. Bank vegetation: fair. Riparian: poor.

Wallen Creek - Location: S of Jonesville, Lee Co. Oct 2 '92.
· Along Rt 612 about 2 1/3 miles SW of Hwy 58 junction; about 1/2 mile upstream of Wallen Creek Primitive Baptist Church - Moderate mussel potential. Small to medium-sized creek. Mostly embedded boulder and cobble, interstitial spaces filled with medium to large gravel. Moderate amounts of small gravel in some areas; no sand. Much silt in any settling area. Shells found; identified by S. Bruenderman as Villosa venuxemensis and Villosa iris. Used waterscope from bank, but saw no live mussels. Fish: snubnose darters, hogsucker, many minnows (several species). Corbicula

abundant. Silt is a big problem; may have wiped out mussels, although one shell was in good condition. Marginal to fair mussel habitat otherwise. Land use: pasture, crops, road, (residential). Terrain: moderate to steep. Riparian: poor. Bank vegetation: fair.

· 1/2 mile downstream of previous site; Wallen Creek Primitive Baptist Church on Rt 612 - High mussel potential. Small to medium-sized creek. Bedrock outcrops and beds of small to medium gravel are the dominant substrate types. Some small cobble; little boulder present. Cattle damage to bank. Shells found; identified by S. Bruenderman as Villosa iris and Pleurobema oviforme. Shells found in muskrat middens, and fresh muskrat tracks present; suggests mussels still living here; habitat and fresh-dead shells in agreement with this. Fish: darters, minnows. Silt problem not as bad in this swift section as it was upstream; gravel beds are fairly clean. Land use: pasture, crops, residential, road, church. Terrain: moderate. Riparian: poor to fair. Bank vegetation: fair. Photos taken.

· About 3 miles downstream of previous site; alongside Rt 612 at a private ford - Low mussel potential. Medium-sized creek. Highly impacted site: auto crossing and cattle trampling. Pool and riffle with gravel bed. No canopy, so abundance of algae grows in still shallows. Very silty in still areas. One very old shell fragment found; not identifiable. Doubtful that any mussels live here now. Terrain: moderate. Land use: road, residential, pasture, crops. Bank vegetation: poor to fair. Riparian: poor. Photos taken.

· 1/2 mile downstream of previous site, at private residence bridge - Moderate (to low) mussel potential. Medium-sized creek. Boulder/cobble riffles with small to large gravel between stones. Fair mussel habitat. Silt in still area, riffles fairly clean. Shells found; identified by S. Bruenderman as Fusconaia subrotunda. Fish: minnows, Micropterus. Land use: road, residential. Riparian: fair. Bank vegetation: fair to good. Photos taken.

· Downstream of previous site; just upstream of Rt 612 bridge and just downstream of Rt 617 turnoff; 1 1/2 miles NE of Hwy 70 bridge - Low to moderate mussel potential (low due to silt). Medium-sized creek. Very silty in riffles and pools. Except for silt, substrate looks good for mussels: wide, shallow riffles with small to large gravel and no larger rocks; many swift-water areas with rubble, boulder, and gravel. One old shell found; identified by S. Bruenderman as Pleurobema oviforme(?). Fish: minnows. Land use: road, pasture. Bank vegetation: poor to fair. Riparian: fair. Many large pastures upstream with cattle in creek and no trees along banks. Photos taken.

· Downstream of previous site; Rt 654 bridge about 200 yd off Rt 612; 2 2/3 miles SW of Hwy 70 bridge - High mussel potential. Medium to large creek. Excellent mussel habitat. Siltation problem greatly reduced from upstream. Gravel islands in stream with Justicia. Lots of cobble and small to large gravel; sand also present. Larger substrate imbedded in sand and fine gravel. Looks similar to Copper Creek in places. Shells found; identified by S. Bruenderman as Villosa iris. More shells seen than

collected. Live mussels likely here. Minnows seen, darters probably here. Riparian: fair to good. Bank vegetation: good. Terrain: moderate to steep. Land use: road, crops. This site should be revisited to search for live mussels. Photos taken.

· Downstream of previous site; Rt 615 bridge crossing 1/5 mile from Rt 612 junction; at Thompson Mill - Moderate to high mussel potential (moderate due to dam effects). Medium to large creek. Similar to previous site, except: dam just upstream; much siltier and water murkier. Justicia gravel bars just downstream from dam. Did not look for shells or fish. Best areas up by dam. Land use: road, residential.

· Downstream of previous site; Rt 616 bridge crossing just upstream of mouth - High mussel potential. Medium to large creek. Excellent mussel habitat. Mostly gravel and bedrock. Deep water (3-4 ft) in several spots, with good flow over clean gravel. Silt problem of previous site much dissipated, with many clean areas and clear water. Shells very common; identified by S. Bruenderman as Villosa iris and Fusconaia barnesiana(?). Minnows, suckers, and sculpins common. Two wood ducks seen. Land use: road, pasture. Terrain: moderate. Bank vegetation: good. Riparian: good. This site should be revisited to search for live mussels. Photos taken.

CLINCH RIVER TRIBUTARIES:

***Indian Creek** - Location: 1 mile E of Cedar Bluff, Tazewell Co. June 16 '92.

· Rt 627 crossing at Mouth of Laurel - Low mussel potential. Small creek. Substrate mostly bedrock and large stones with little gravel. No shells found. Land use: residential, road. Well forested on one side. Moderately steep terrain on south side.

· Downstream of previous site; 1 mile upstream of Cedar Bluff; Rt. 631 crossing - Low mussel potential. Small stream; one small pocket of fair substrate mix (gravel/cobble) exists below a short fall, but this is isolated. No shells found. Land use: residential, road. Riparian area fairly good upstream of bridge. Flat terrain; riprap on banks near bridge.

· Mouth of Indian Creek - Moderate mussel potential. Medium-sized creek. Habitat looks very good in the 15 meter length of stream emptying into Clinch River, with substrate of small to large gravel and small cobble; this was replaced by bedrock immediately upstream. Shells were found; not identified. A few species of fishes were seen. Stream width about 10 m. Little riparian area; flat terrain. The present of mussel habitat and shells here is likely a result of influence by Clinch River.

Note: A single mussel valve collected from this stream during the VPI Dept. of Fisheries and Wildlife warmwater survey on 22 July '92 (pers. comm. Roy Smoger) was later identified by S. Bruenderman as Lampsilis fasciola.

Swords Creek - Location: Russell Co., 8 miles SW of Richlands, Tazewell Co. Aug '92.
· Rt. 622 crossing - Low mussel potential. Stream small. No mussel habitat; substrate of large, flat slabs. No shells found. Moderately steep terrain on east side.
· Downstream of previous site; railroad crossing near mouth - Low mussel potential. Medium-sized creek with mix of small to large gravel and shallow riffle areas; marginal to fair mussel habitat. Heavily impacted site; silt in riffles, still areas silted in. Greenish algae covering the bed. No shells found. Only fish seen were stonerollers; a stream this size should hold many more species. Banks eroded near site and upstream; sources of impact other than RR and highway unknown. Flat terrain. Land use: railroad, highway, residential, commercial.

Big Cedar Creek - Location: 2 miles E of Lebanon, Russell Co.
· Rt. 640 crossing, Aug '92 - Moderate mussel potential. Very large stream. Limited mussel habitat, with mostly bedrock substrate; stream size warrants further investigation of the creek. Steep terrain on west side; much of riparian area cleared. Land use: residential and pasture. Could not look for shells.
· Upstream of previous site; Hwy 19 Lebanon bypass crossing, Oct 23 '92 - Mussel potential:? Very large creek. High nutrient load evident: organic scum/algae thick in pools and riffles, even choking some riffles. Substrate mixed, gravel to boulder, but could not see it well. Land use: mostly pasture; road. Terrain: moderate. Riparian: poor. Bank vegetation: poor. Could not get near stream to look for shells; fenced off (30 m).
Note: The entire stretch of stream along Rt. 658 has a mixture of habitats, including riffles, runs, glides, and deep and shallow pools. Substrate of flat bedrock to gravel; lots of boulder and rubble. Could not get down to stream for a close look, but the large size and varied habitats here make it unlikely that mussels did not occur here historically. However, the creek appears highly impacted by cattle and other sources (including a water treatment facility on this stretch), making the possibility of mussels still living here very questionable. This stream needs to be reclaimed, if anything still lives here. It looks like an historically diverse stream.

Big Stony Creek - Location: At Ft. Blackmore, Scott Co. Aug '92.
· Section from Ft. Blackmore to Lano - Low mussel potential. Medium-sized stream. No mussel habitat found. Substrate of large, smooth boulders and cobble upstream; smaller substrate found downstream, but still too large for mussels; no sand or small gravel. Stream supports a trout fishery. Did not visit mouth of stream. Terrain: moderate. Land use: residential, road. No shells found.

Hess Creek - Location: Tributary to Swords Creek, Russell Co., at Rt. 622 crossing. Aug '92. Low mussel potential. Small creek. No mussel habitat, substrate of large flat slabs; stream too small for mussels. No shells found.

Elk Garden Creek - Location: Tributary to Big Cedar Creek, 2 miles E of Lebanon, Russell Co. Aug '92.
· Section along Hwy 19 & 80 - Low mussel potential. Very small, only about 1 meter wide. Substrate of large rocks with little gravel. No mussel habitat. No shells found.

Little River - Location: Russell Co., 10 miles SW of Richlands, Tazewell Co. June 16 '92.
· Near mouth - High mussel potential. Large stream. Excellent mussel habitat available; many shells found. Mussels in this stream have been documented previously. Flat terrain; some bank erosion. New bridge going in over Clinch River on Hwy 80.

Weaver Creek - Location: 5 miles NW of Lebanon, Russell Co. Aug '92.
· Along Rt. 663 - Low mussel potential. No mussel habitat; stream too small. Substrate of large rocks with very little gravel. Steep terrain. No shells found.
Note: Valves of Villosa iris (identified by S. Bruenderman) were collected during the VPI Dept. of Fisheries and Wildlife warmwater survey on 26 June '91 (pers. comm. Roy Smoger). Verification that this is the same Weaver Creek is still needed.

Dumps Creek - Location: At Carbo, Russell Co. Aug '92.
· Near junction of Rt. 615 & 600 - Low mussel potential. Small stream. Substrate large; cobble and large gravel. Steep terrain.
· Downstream of previous site; along Rt. 616, just above mouth - Low mussel potential. Fairly small stream, probably dry in summer. Substrate smaller than upstream; cobble and medium to large gravel, but no sand; still poor habitat for mussels. Silt accumulated in pools but not found in riffles. Several fish species seen. Two gravel bars searched, one Corbicula shell but no mussel shells found. Steep terrain; good riparian areas; banks in good condition.

Guest River - Location: 6 miles SE of Coeburn, Wise Co. Aug '92. Large stream. No access to lower portion. Tried to reach river on Rt. 660, but in was gated off (private). May want to go further upstream later.
· Hwy 72 crossing - Low (to moderate) mussel potential. Large stream. Substrate mostly boulders and large rocks. Highly impacted. Silt covered boulders and other substrate in pools and riffles. No shells found. Flat terrain. Land use: residential and highway. Degradation of this stream makes the presence of mussels unlikely at this site.

Toms Creek - Location: Tributary to Guest River, 2 miles N of Coeburn, Wise Co. Aug '92.
· Along Hwy 72 - Low mussel potential. Stream too small; no mussel habitat. No shells found.

Mill Creek - Location: At Hill, Scott Co. Aug '92. Low mussel potential. Stream was too small to support mussels. No mussel habitat found. No shells found.

Stock Creek - Location: At Clinchport, Scott Co. Aug '92.
Section between mouth and Natural Bridge St. Park - Low mussel potential. Moderately small creek. Heavily impacted; very silty and appears polluted. Impacts to stream originate upstream. No shells found.

*__Indian Creek__ - Location: Tributary to Little River, 5 miles S of Richlands; Tazewell/Russell Co. Oct 23 '92.
Hwy 19 crossing at Rt 770 junction, Russell Co. - Moderate to high mussel potential (moderate due to inability to locate fish). Medium-sized creek. Substrate mix of fine to large gravel (imbedded) mixed with sand; also some cobble, but not much. All riffles here (one small pool). Water very clear. No silt on substrate where current exists, but embedded silt is a problem. Slight silt in slow areas. Mussel shells common, easy to find. Identified by S. Bruenderman as Villosa iris. Problem: not one fish seen after much searching. They should be abundant in this habitat in a stream this size, and easy to spot; they should also be out at this time of year, as I saw many fish in other streams. Why are there no fish visible? Pollutant spill? Land use: road, residential. Terrain: moderate. Riparian: poor to fair. Bank vegetation: good. A spring enters here. Photos taken.
Note: Mussel habitat exists throughout the stream, but is better in Russell Co. Substrate turns more to boulder/rubble downstream. Water stays clear throughout stream, but siltation becomes heavy in lower section. Most of watershed has been cleared of trees for pasture, right down to the stream bank. Riparian: poor. Bank vegetation: poor. Land use: **pasture**, road, residential. Terrain: moderate. Photos taken. No fish seen throughout creek after much searching, although abundant in Little River where Indian Creek feeds in. Roy Smogor (warmwater stream survey) found lots of fish in Indian Creek (pers. comm.), including Etheostoma swannanoa, an uncommon fish.

*__Sinking Creek__ - Location: 2 miles E of Dungannon, Scott Co. This stream was not visited during this survey. Shells were collected from Sinking Creek on June 24 '91 by VPI Dept. of Fisheries & Wildlife Sciences warmwater streams survey (pers. comm. Roy Smogor); these shells were identified by S. Bruenderman as Villosa iris. Verification of location is still needed.

*__Thompson Creek__ - Location: Near Artrip, upstream of Weaver Creek. This stream was not visited during this survey. Shells were collected from Thompson Creek on June 23 '92 by VPI Dept. of Fisheries & Wildlife Sciences warmwater streams survey (pers. comm. Roy Smogor); these shells were identified by S. Bruenderman as Fusconaia barnesiana. Verification of location is still needed.

NORTH FORK OF HOLSTON RIVER

Locust Cove Creek - Location: Along Hwy 42, in northern Smyth Co. Sept 10 '92.
· Between Rt 629 and 630, at Powerboss building (closed) - Low mussel potential. Medium-sized creek. Size similar to Stock Creek in Clinch drainage. Mixed substrate, mostly small cobble to boulder with fair amount of fine to large gravel. Heavily silted; junk in stream. Foam on water. No shells found. Lots of snails. Fish seen: juvenile Micropterus; a few minnows. Steep, eroded banks. This is a highly erosional portion of the stream, with few trees along banks. Terrain: moderate. Land use: road, commercial, pasture. There is extensive pastureland upstream with cattle having free access; banks are vertical and eroded and without vegetation over much of it. Photos taken.
Note: upper portion of stream (above pastures) is very well vegetated; excellent riparian zones, with no clearing. Limited access. From about 50 yds: stream is in better shape than downstream; still fairly good size. Mixed substrate. Couldn't tell about silt. Terrain: steep. Mussel potential: ?
· Downstream of previous site; Rt 630 crossing, just upstream of mouth - Low mussel potential. Medium-sized creek. Similar to previous site, but more gravel, banks lower, and terrain flat. Land use: road, pasture, corn, and tobacco. Looks less silty than upstream, but plenty of silt exists in pools and embedded in substrate. No shells found. Many minnows seen, probably more than one species. Riparian: none. Geese and cattle in stream. Photos taken.

Laurel Creek - Location: near Broadford, Smyth and Tazewell Co. Sept 10 '92.
· Along Hwy 91, about 1/2 mile upstream of Hwy 42 junction, Smyth Co. - High mussel potential. Very large creek. Good mix of substrate: lots of boulder and plenty of fine gravel. Very good mussel habitat. Several fish species seen. One mussel shell found; identified by R. Neves as Villosa vanuxemensis. Riparian: excellent. Bank vegetation: good. Terrain: steep. Banks steep also. Land use: highway. Easy access. Photos taken.
· Upstream of previous site; Rt 601 at Tannersville Volunteer Fire Dept., Tazewell Co. - High mussel potential. Large creek. Similar to previous site, but few boulders present. Plenty of gravel and sand. Good mussel habitat. No shells found. Snails present. National Forest close by. Land use: road, crops, recreation. Terrain: flat. Riparian: poor to none. Land cleared for recreation and crops. Banks stable. Bank vegetation: good. Good access here. Photos taken.
Note: still a good-sized stream upstream of Little Tumbling Creek. No shells seen, but substrate still good. Pastures and crops. R. Neves snorkeled 400 m section upstream of Hwy 91/42 crossing Oct 3 '92, finding shells of Fusconaia subrotunda, Villosa vanuxemensis, and V. iris (identified by S. Bruenderman).

McHenry Creek - Location: 2 1/2 miles SW of Saltville on Hwy 91, Washington Co. Sept 10 '92.
· At Church of God (built over creek) adjacent to Hwy 91 - Low (to moderate) mussel potential (low due to stream size and silt). Moderately small creek, but with a good flow. Good mussel habitat, with lots of fine gravel. A lot of silt. Junk in stream. No shells found. Many stonerollers seen. Bank vegetation: fair. Riparian: none. Land use: residential, highway. Terrain: moderate. Photos taken.
Note: Stream much too small for mussels above South Fork of creek.

Stonemill Creek - Location: Near Hanckel, Washington Co. Sept 10 '92.
· At Rt 700 crossing near Hanckel - Low mussel potential. Small creek. Substrate almost all bedrock; little to no gravel. No mussel habitat. No shells found. Cattle in stream. Land use: tobacco, pasture, road. Photos taken.

Big Tumbling Creek - Location: 4 miles W of Saltville, Washington Co. Sept 16 '92.
· 611 bridge crossing just upstream of mouth - Low mussel potential. Large creek. Trout fishing area (stocked). Boulder and cobble mix; rounded stones. Very little gravel and smaller material. Not good mussel habitat. No shells found. Riparian: fair on one side, poor on other. Terrain: moderate. Land use: residential, road.
· Upstream of previous site; along Rt 747, just off Rt 613, across from campground - Low mussel potential. Large creek. Stream and substrate similar to previous site, but more interstitial gravel present. No shells found (used waterscope). Riparian: excellent. Terrain: moderate. Banks steep and rocky. Photos taken.
Note: Met John Jesse: he said that no mussels have been reported from this stream. Many short falls and cascades occur just up from the uppermost site. Stream turns to freestone: mostly cascades and pools with boulder. No mussel habitat. Entire stream is trout waters. Stonerollers the only fish seen. Only went 1 3/4 miles upstream of 613 turnoff before turning back.

Little Moccasin Creek - Location: Holston, Washington Co. Sept 16 '92.
· One mile section along Hwy 19 N of Rt 689 turnoff - Low mussel potential. Substrate almost entirely boulder. No mussel habitat. No shells found. Whether substrate is natural or due to road construction is unknown. Steep grade from road to stream, about 100 ft. Riparian: good. Bank vegetation: good. Land use: highway. Could not get close to stream here. Photo taken.
· Upstream of previous site, section that runs between north- and southbound lanes - Low mussel potential. Small creek. Substrate of boulder and large cobble. Silty, likely due to road. No mussel habitat. No shells found. A 1 1/2 ft drop below a culvert under northbound lane creates an impediment to fish passage.

Wolf Creek - Location: along Hwy 80, near Hayter's Gap, Washington Co. Sept 16 '92.
· East Fork of Wolf Creek, along Hwy 80, just N of Rt 689 turnoff - Moderate to low mussel potential. Small to medium-sized creek. bedrock pools and riffles; some graveled areas in pools; two gravel riffles here. No shells found, but could not get in water. Small minnows seen, probably all stonerollers. Terrain: flat on one side, moderate on other. Banks steep. Riparian: none. Bank vegetation: good. This section fenced from road. Tobacco fields 200 yd away. Few residences. Land use: highway, crops, residential. Photos taken.
· Downstream of previous site; at junction of East and West Forks of Wolf Creek, at Hayter's Gap School - Moderate to low mussel potential. Large creek. Other characteristics similar to previous site, but riparian zone is better. No shells found. Photos taken. Note: stream is "freestone" downstream of this site.
· Hwy 80 bridge at mouth of Wolf Creek - Low mussel potential. Large creek. All bedrock outcrops and broken bedrock (flat boulders and cobble). No gravel. No mussel habitat. No shells found. Photos taken.

Beaver Creek - Location: near North Holston, Smyth Co. Sept 10 '92.
· Near bridge crossing 1 1/2 miles upstream of mouth - Low mussel potential (stream size, impact). Small to medium-sized creek. Habitat marginal: mostly cobble and large gravel; some smaller material. A lot of silt and algae. Heavily impacted by surrounding pastures and cropland. Steep, eroding banks. Bank vegetation: poor to fair. Riparian: none. Land use: pasture, crops, road, residential. No shells found. Fish: many stonerollers, one probable Micropterus. Photos taken.

Greendale Creek - Location: 5 miles NW of Abingdon, Washington Co. Oct 21 '92.
· Rt 700 crossing at Greendale, just off Hwy 19 - Low mussel potential (small size, spring influence). Small creek with narrow channel. Appears to be mostly springwater: a lot of watercress; clear water and bed despite development. Mostly small to medium gravel. Short falls and cascades (up to 2 ft). No shells found. No fish seen, but spring-community is probably present. Land use: highway, residential, commercial. Riparian: poor; mostly lawns to water's edge. Terrain: moderate. Bank vegetation: fair (lawns). One side of stream by parking lot riprapped. Photos taken.

Nordyke Creek - Location: One mile E of Pine Grove, Washington Co. Sept 17 '92.
· Section along Rt 622 between mouth and 616 turnoff - Low mussel potential. Small creek. Substrate of large gravel to small cobble mixed with some small gravel. Very silted. Organics and silt cover the substrate; even movement of minnows stirs it up. No shells found; looked in water and on exposed rocky bars. Fish: stonerollers, shiners, and sunfish. Riparian: good in some areas. Bank vegetation: good in some areas. Pastures and cropland common in lower section. Terrain: steep in most areas (forested).

Smith Creek - Location: Craigs Mill, Washington Co. Sept 17 '92.
· Along Rt 614, section downstream of Rt 625 turnoff - Low mussel potential. Small to medium-sized creek. Large gravel to small cobble; mostly still pools. Very silted. Cattle in stream at one point. No shells found. Fish: sunfish, minnows. Riparian: fair to poor. Bank vegetation: good. Terrain: flat. Land use: road, crops, pasture.

Toole Creek - Location: Along Rt 692, 3 miles N of Abingdon, Washington Co. Oct 21 '92.
· Rt 692, where creek goes under road (culverts) and small road joins on west side; 1 1/4 miles S of White Mill - Low mussel potential. Small to medium-sized creek. Heavy silt load. Some clean gravel and rubble, but most areas covered in silt. Small cobble dominant in clean areas. Little good, clean mussel habitat. Lots of cattle seen in water downstream. No shells found (searched in water). Juvenile and adult minnows seen. Small dam downstream feeds an old mill. Riparian: fair to good. Bank vegetation: fair. Terrain: steep. Land use: road, probably pasture. Photos taken.
· Downstream of previous site; Rt 692, about 1 1/4 miles upstream of mouth of creek - Low to moderate mussel potential. Medium-sized creek. Many falls along this section (up to 6 ft). Substrate mostly bedrock; some gravel and rubble, but more boulder. A few gravel pockets exist, but these are very small and shallow, with boulder/bedrock underneath. Less silt load than found upstream; many clean areas. No shells found (searched banks and water). Terrain: steep. Land use: road, cattle, residential. Heavy cattle damage to banks, although area has not been cleared for pasture. Riparian: good. Bank vegetation: fair. Photos taken.
· Between two previous sites; at downstream junction of Rt 692 and 700 - Moderate mussel potential. Small to medium-sized creek. Good mussel habitat exists here. Large, clean beds of fine to small gravel; also lots of bedrock. Moderate silt load. Some spring influence (watercress along shore). No shells found (searched in water). Land use: road, pasture, residential. Terrain: moderate. Riparian: poor. Bank vegetation: poor to fair. Cattle in creek here. Photos taken.

Brumley Creek - Location: Brumley Gap, Washington Co. Sept 16 '92.
· Section parallel to Rt 687, downstream of Rt 687 bridge - Low mussel potential. Large, freestone stream. Round boulders and cobble; bedrock. Trout habitat; no mussel habitat. No shells found. Roadwork on this short road; erosion potential high along sides due to this. Stream apt to receive silt. Roadsides stripped of vegetation; often all the way to stream bank. Photos taken.
· Downstream of previous site; Rt 611 bridge crossing just upstream of mouth - Low mussel potential. Large creek. Free-stone. Boulder and cobble. No mussel habitat. No shells found. Photos taken.

Finley/Maiden Creek - Location: 4 1/2 miles NE of Abingdon, Washington Co. Oct 21 '92.
· One mile section along Rt 741 upstream of Rt 700 junction - Low (to moderate) mussel potential. Small creek. Abundance of gravel. Moderately high silt load (a lot of cattle and pastureland all along creek). No shells found. Terrain: moderate to steep. Land use: pasture, road, residential. Riparian: poor. Bank vegetation: poor. Banks badly eroded in places. Almost entirely fenced off for pasture use. Difficult access to stream N of Rt 700 crossing. Photos taken.

Logan Creek - Location 6 miles NE of Abingdon, Washington Co. Oct 21 '92.
· Along Hwy 80, downstream of Rt 700, about 200 yd from mouth - Low to moderate mussel potential (low due to falls, moderate due to substrate mix). Medium-sized creek. Lots of good mussel habitat (clean gravel with rubble and boulder), but many falls and cascades (up to at least 5 to 6 ft) are in this section. Substrate very clean, with little silt present. Trash and appliances on bank by road. No shells found in water or on bank. Land use: road, some residential. Terrain: steep. Riparian: good. Bank vegetation: good (sparse, but good for such a wooded stream). Photos taken.
Note: upstream of Rt 700, stream gets rapidly smaller; lots of spring influence, also. Much of surrounding land is pasture. No falls or cascades. Lots of small gravel and sand; but not much else. No shells found, but little effort was made here. Low mussel potential.

MIDDLE FORK OF HOLSTON RIVER

Walker Creek - Location: 3 miles W of Marion, Smyth Co. Sept 9 '92.
· Rt 659, 1/4 mile upstream of Rt 645 crossing; just upstream of mouth - Low (to moderate) mussel potential. Small creek. Substrate mixed; mostly cobble; not much small gravel; moderate amounts of medium to large gravel. Poor mussel habitat. No shells found, but only a small area searched. Land use: road, pasture (fenced from road). Some bank damage evident. Riparian: poor. Terrain: moderate. Banks short.

Hungry Mother Creek - Location: In and N of Marion, Smyth Co. Sept 9 '92.
· Section of road between Hwy 645 and 617 paralleling stream, about 2 miles downstream of Hungry Mother Lake; just NW of Marion - Moderate mussel potential (due to silt). Moderately large creek, large enough to potentially hold mussels. Large pool here, with riffles downstream. Good substrate, with small gravel to large, flat cobble; very silted. No shells found. Fishes seen: sunfish, two large carp, schooling minnows (probably Campostoma). Elodea abundant. Land use: road, pasture. Private land (fenced);

pasture on one side, but no cattle or signs of them seen; no visible land use on other side, but mostly cleared. Stream banks steep on one side, not on other. Terrain: moderately steep. Riparian: fair (about 15 - 20 ft on each side). Photos taken.
· Section above Hungry Mother Lake along Rt 648 (Rt 703 in Gazetteer), 2 road miles upstream of Hwy 16 turnoff - Low mussel potential. Small creek, much smaller than below dam. Bed is almost entirely bedrock and some flat, broken pieces of cobble. No mussel habitat. No shells found. Few juvenile minnow seen. No aquatic vegetation. Mostly riffles and small pools. Easy access; possibly private, but house is close by. Bank vegetation: good. Riparian: good. Land use: road, residential. Terrain: low to moderate. Banks steep but small. Photos taken.
· Bridge 1 mile downstream of previous site, still above Hungry Mother Lake - Moderate to low mussel potential (low due to stream size). Small creek. More suitable habitat than upstream, with small gravel and sand to cobble. No shells found. Sunfish and crayfish seen. Other characteristics same as previous site. Public access. Photos taken.
· Campground just downstream of Hungry Mother dam - Moderate mussel potential. Medium-sized creek. Substrate good; mix of sand to large gravel (plenty of fine material) and bedrock. No silt on substrate, but plenty of silt embedded. Very shallow; riffles. Some Elodea. No shells found. No fish seen, but probably are here. Riparian: rich on one side, mostly cleared on opposite shore for camping. Terrain: steep on one side, flat on other. Land use: camping. Easy access, owner agreeable. Photos taken.
· At Rt 658 (Chilhowie Rd) crossing, downstream of all other sites - Could only look from bridge. Mussel potential: ?. Large creek. Substrate looked mixed, but could not determine composition. Riparian: fair. Land use: residential, business, road.

SOUTH FORK OF HOLSTON RIVER

Spring Creek - Location: 4 miles E of Bristol, Washington Co. Sept 17 '92.
· Section along Rt 663 - Low mussel potential. Medium-sized stream. Impacted. Very silty, covering substrate. Cattle in stream. Erosional, vertical banks. Cropland and pastureland abundant, with trees removed all the way to banks. No shells found.

St. Clair Creek - Location: Along Rt 600, S of Chilhowie, Smyth Co. Oct 22 '92.
· Along Rt 600, 4 miles S of Chilhowie - Low mussel potential. Small creek. Mostly rubble and boulder; some gravel and sand. Interstitial material present. Silt moderate. Stream too small for mussels. No shells found. Stonerollers seen. Terrain: moderate. Land use: road, residential. Riparian: poor to fair. Bank vegetation: poor to fair.

Beaverdam Creek - Location: S of Damascus, Washington Co. Tributary to Laurel Creek. Oct 22 '92.
· Along Rt 716, 1 mile S of Damascus - Low mussel potential. Large creek. Stream and riparian zone very suggestive of trout waters. Water very clear, little or no silt. Substrate rounded: boulder, rubble, and some large gravel. No interstitial material. No mussel habitat. No shells found (searched in water and on rocky bars). Juvenile minnows seen. Most of Laurel Creek system is stocked with trout; although this stream is not shown as such on my map, it very likely is (or could be) stocked. Lots of Rhododendron along shore. Land use: residential, road. Terrain: moderate. Riparian: good. Bank vegetation: good (for this type of stream). Photos taken.

Tennessee Laurel Creek - Location: 1 mile E of Damascus, Washington Co. Tributary to Laurel Creek. Oct 22 '92.
· Along Hwy 91, across road from VFW building, about 1/4 mile upstream of mouth - Low to moderate mussel potential. Large creek. Trout fishing area. Habitat better for mussels than in Beaverdam Creek, but still not great. Large areas of clean sand common. Fine to medium gravel present, along with rubble and smaller proportion of boulder. Large rocks rounded. Plenty of interstitial material (sand and gravel). Very clear water. Habitat appears better for trout than mussels. No shells found in water or on bank. Fish: hogsucker, others. Land use: road, residential. Terrain: steep on one side, flat to moderate on other. Riparian: good on one side, poor to fair on other. Bank vegetation: good (for this type stream). Photos taken.

Laurel Creek - Location: E of Damascus along Hwy 58, E of Hwy 91 junction, Washington Co. Oct 22 '92.
· Along Hwy 58 about 1/2 mile E of Hwy 91 junction N of Laureldale - Low to moderate mussel potential. Very large creek. Trout stream. Similar to Tennessee Laurel Creek description, except: no sandy areas; more boulder present. No shells found. At least 2 species of minnows seen. Terrain: moderate. Riparian: good. Bank vegetation: good (for such a stream). Photos taken.
Note: Spoke with two old-timers (VFW cabin): They had never seen mussels in this stream (40-50 yrs). Aquatic life has gone downhill in last 10 yrs: no waterdogs now, crayfish gone; a schooling red-sided fish (probably a dace) that was once common is gone. It has been like this since a 2 yr green growth on stream bed occurred 8 yrs ago.

Straight Branch - Location: In Mt. Rogers NRA along Hwy 58, Washington Co. Tributary to Laurel Creek. Oct 22 '92.
· Low mussel potential. Small creek. Mostly boulder and bedrock, some rubble. No mussel habitat. No shells found.

Grosses Creek - Location: 4.5 miles S of Chilhowie, Smyth Co. Oct 22 '92. Low mussel potential. Small creek. No mussel habitat. No shells found.

Fifteenmile Creek - Location: S of Abingdon, N of reservoir; Washington Co. Oct 1 '92.
· Rt 676 bridge at junction with Rt 672 - Low (to moderate) mussel potential. Large creek. Lots of silt here and at all places seen upstream, due to pastureland and erosional banks without trees. Good mussel habitat did once exist here with small to medium gravel beds in riffles between bedrock outcrops. Siltation is now very heavy and covers much of the substrate. Small areas still remain fairly clean. Corbicula are very abundant; muskrats active. Two relict mussel shells found, identified by S. Bruenderman as Pleurobema oviforme(?); could be very slight chance of a few live ones remaining, but doubtful. Land use: residential, pasture, road, hay. Riparian: poor. Bank vegetation: fair. Terrain: moderate. Photos taken. A long pool (about 500 yd) exists downstream of the bridge, due to a dam. Much of stream below the dam is mostly bedrock with some gravel; Corbicula still common.
Note: Upper portion of Fifteen Mile Creek, along Hwy 58 and Rt 677, is very spring-influenced, with abundance of watercress and aquatic vegetation; very silty, impacted; lawns and pastures along banks.

Wolf Creek - Location: S of Abingdon, N of reservoir; Washington Co. Oct 1 '92.
· Hwy 75 crossing by Rt 672 turnoff - Low (to moderate) mussel potential. Large creek. Many bedrock outcrops and cascades; some small, clean gravel beds. Silted. No shells found. Land use: highway, residential, pasture. Riparian: poor. Bank vegetation: fair to poor. Terrain: moderate. Photo taken.
· Downstream of previous site; second Rt 670 bridge (Rt 658) from turnoff off Hwy 75 toward reservoir; near Green Spring - Moderate to high mussel potential. Large creek. Plenty of mussel habitat. Mostly beds of sand and gravel; some cobble, bedrock, and small boulder. Very silty in all areas. Corbicula everywhere. Possibly saw some mussel shells in water from bridge. Could not get close to water (posted property). Terrain: moderate. Land use: road, residential, pasture. Riparian: poor. Bank vegetation: fair. Ducks in water. Photos taken.
· Upstream of other sites; Rt 794 crossing just off Rt 670, 1 mile S of Abingdon - Low mussel potential. Small to medium-sized creek. Heavily silted; silt covers all substrate. No shells found. Terrain: flat to moderate. Land use: road, crops, residential. Riparian: poor. Bank vegetation: good. Photos taken.
Note: Abingdon Wastewater Treatment Facility Located on Wolf Creek at Rt 670 bridge, 1 mile S of Abingdon.

Beaver Creek - Location: in and NE of Bristol, upstream and downstream of Beaver Creek Lake, Washington Co. Aug '92. Low mussel potential. Small to medium-sized creek. Heavily silted above and below reservoir. No shells found. Upstream of reservoir: small creek with eroding banks, extremely impacted by pasture use. Downstream of reservoir: pools and riffles silted, tributaries similar; carp common.

SUMMARY

A total of 55 tributary streams were assessed during the summer field season of 1992 in the course of this study. The distribution of these within the Tennessee River system was: Powell River, 14 streams; Clinch River, 14 streams; North Fork Holston River, 15 streams; Middle Fork Holston River, 2 streams; and South Fork Holston River, 10 streams. Mussel shells collected from two additional streams, Thompson Creek and Sinking Creek, during the VPI Dept. of Fisheries & Wildlife Sciences warmwater streams survey are also reported here. Two other streams, Copper Creek and Little River, were also visited in 1992; however, the mussel communities of these stream are well documented and are not included here.

Shells of six species of mussels were found at 10 of these 57 tributaries: Fusconaia barnesiana, F. subrotunda, Lampsilis fasciola, Pleurobema oviforme, Villosa iris, and V. vanuxemensis. No evidence of any threatened or endangered species was found, but valves of F. barnesiana, a special concern species in Virginia, were found in Thompson Creek and possibly in Wallen Creek.

Stream	Tributary of	Species
Indian Creek	Clinch River	*Lampsilis fasciola*
Thompson Creek	Clinch River	*Fusconaia barnesiana*
Weaver Creek	Clinch River	*Villosa iris*
Sinking Creek	Clinch River	*Villosa iris*
Indian Creek	Little River	*Villosa iris*
Laurel Creek	North Fork Holston River	*Fusconaia subrotunda*
		Villosa iris
		Villosa vanuxemensis
Fifteenmile Creek	South Fork Holston River	*Pleurobema oviforme*(?)
Wallen Creek	Powell River	*Fusconaia barnesiana*(?)
		Fusconaia subrotunda
		Pleurobema oviforme
		Villosa iris
		Villosa vanuxemensis
Martin Creek	Powell River	*Villosa vanuxemensis*
Indian Creek	Powell River	*Pleurobema oviforme*(?)
		Villosa vanuxemensis

In addition to the streams above, mussel shells may have been seen in Wolf Creek, a tributary to South Fork Holston River, but could not be investigated closely due to posting of private property.

Streams identified in this study as warranting further investigation include those streams where shells were collected, Wolf Creek (South Fork Holston), Big Cedar Creek (Clinch), lower Straight Creek (North Fork Powell), Toole Creek (North Fork Holston), and lower Hungry Mother Creek (Middle Fork Holston).