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1985

HABITAT RESOURCES
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The Mussel Fauna of the Proposed Haysi Reservoir Project Area, Buchanan and Dickenson Counties, Virginia

Submitted To
The Huntington District
U.S. Army Corps of Engineers
Huntington, West Virginia

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Cookeville Field Office
Cookeville, Tennessee
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LIST OF FIGURES

Introduction

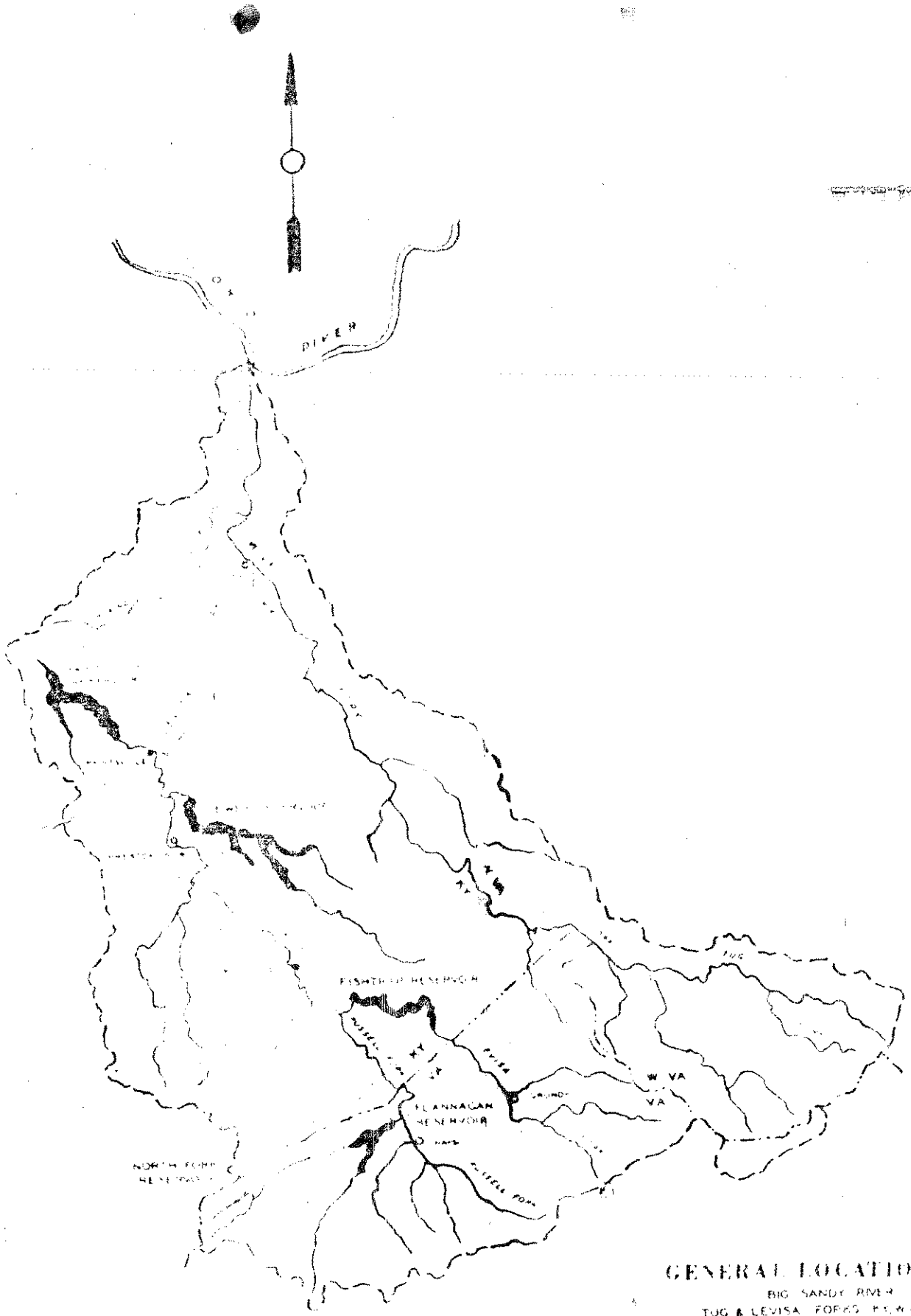
The Huntington District of the U.S. Army Corps of Engineers (COE) is currently studying the feasibility of constructing a flood control reservoir at River Mile 29.8 of the Russell Fork of the Big Sandy River, Buchanan and Dickenson Counties, Virginia. Authorized by Section 202 of the Energy and Water Development Appropriation Act of 1981, the reservoir would control runoff from 87.6 square miles in the headwaters providing flood relief for the towns of Haysi, Virginia and Elkhorn City, Kentucky. Consideration is also being given to storing and releasing water in conjunction with increased discharges from the existing John W. Flannagan Reservoir on the Pound River. This additional water would provide whitewater recreation on the Russell Fork from Haysi, Virginia, to Elkhorn City, Kentucky (approximately 11 stream miles).

Impoundment of the Russell Fork and regulated discharges from Haysi and Flannagan Reservoirs would likely result in significant changes to the existing lotic system, possibly reducing or eliminating aquatic invertebrate populations. Based upon previous, incidental sitings there was reason to believe that viable populations of freshwater mussels inhabited portions of the Russell Fork within the project area. The subject effort was initiated to qualitatively and quantitatively survey the Russell Fork and its major tributaries to determine the status of existing freshwater mussel populations. Specific objectives of the survey were to determine species diversity, relative numbers, distribution, and general conditions of the overall population.

Area Setting

The study area is located within the upper one-half of the 680 square mile Russell Fork watershed (Ref. Figure 1). Russell Fork originates in the southern most portion of Buchanan County, Virginia, and is the largest tributary of the Levisa Fork of the Big Sandy River. It flows northwest for 45 miles to its confluence with the Levisa at Millard, Kentucky, 12.2 miles upstream from Pikeville. A total of 30 miles of channel lie within Virginia, and 15 miles within Kentucky.

The upper Russell Fork drainage lies within the very rugged Kanawha section of the Appalachian Plateau Province. The floodplain is subsequently extremely narrow and is surrounded by steep, mountainous terrain. The elevation differential experienced by the channel is great, falling from 1,770 feet msl in the headwaters, to 665 feet msl at the mouth. The greatest drop occurs within the 12 mile reach downstream from Haysi, Virginia where the channel falls a precipitous



GENERAL LOCATION MAP

BIG SANDY RIVER

TUG & LEVISA FORKS KY, W VA & VA

Figure 1.

450 feet. Gradient within the survey area ranges from 10 to approximately 20 feet per mile.

Due to the topography of the area, the overall physical character of the Russell Fork changes significantly throughout the 22.5 mile section which is the subject of this survey. The following is a brief reach-by-reach description of the Russell Fork mainstem and primary tributaries.

Russell Fork from Skegg Tunnel Railroad Bridge to Pound River Mouth

This 1.5 mile reach exhibits a relatively high gradient channel as it begins its decent into the Breaks of the Big Sandy gorge area. The lower 0.7 miles of channel is dominated by large, deep boulder strewn pools with shifting sand bottoms. The upper 0.8 miles of channel contains a high percentage of scoured sand, and lacks the mix of sand, gravel, and cobble most suitable to mussels. This reach is influenced by fluctuating cold water releases from John W. Flannagan Reservoir via the Pound River. Water temperatures remain sufficiently low to permit stocking of trout by the Virginia Commission of Game and Inland Fisheries (VACGIF). The channel averages 80 feet in width and supports very little vegetation.

Lower Pound River

The Pound River has a good mix of sand, gravel, and cobble substrate. The channel has a relatively uniform width of 45 feet and consists primarily of deep riffles (greater than one foot in depth) and long, broad runs. Water temperature is consistently low due to releases from Flannagan Reservoir. Substrate scouring is evident and the water appears to lack nutrients. A very heavy layer of coal fines, possibly from adjacent strip mines, was observed on the substrate of the Pound during the survey period.

Russell Fork from Pound River to Splashdam

This high gradient, high velocity reach exhibits pockets of suitable mixed aggregate substrate but is dominated by large boulders and broken rock. Water flows a tortuous route between the boulders and rock and few definitive pools or riffles are evident. Channel width fluctuates significantly but averages about 60 feet in width. Both banks are extremely steep and the right bank supports the Clinchfield Railroad track. There is considerable evidence of both coal and sewage pollutants in this reach which appear to originate from around Splashdam and the coal mining/loading facilities which exist there.

Russell Fork from Splashdam to 400 yards Downstream of Haysi High School

This reach is the most heavily developed with the town of Haysi and associated developments encroaching on both stream banks. This reach appears, however, to have previously provided some excellent mussel habitat. The channel is broad and of moderate gradient (approximately 12 feet per mile) with a good diversity of moderately deep pools and runs interspersed by broad riffles. Much of the substrate is composed of a stable sand, gravel, and cobble mix. Substrate stability is evidenced by the extensive growth of water willow in shoreline and bar areas. During the course of the subject survey, most of the channel was being excavated for sewer line construction. Indiscriminate and unnecessary construction activities had destroyed most instream habitat. Sediment levels were extremely high.

McClure River from Mouth to Camp Creek

The McClure River is a relatively small tributary stream which joins the Russell Fork at Haysi. The stream channel averages 20 feet in width and summer flows are particularly low. The watershed is fairly heavily developed, however, and there is evidence of large discharges and considerable substrate scouring. Substrate composition is fairly desirable for mussels (cobble and gravel), but only isolated pockets appear to remain stable. The lower 300 yards of channel have been disrupted for sewer line construction and considerable gravel dredging has occurred at the site of an old ford. Isolated sewage discharges were also observed.

Russell Prater Creek

Russell Prater Creek is a small tributary (10 to 15 feet wide) which flows through Haysi. Substrate consists primarily of large boulders and rocks and flow becomes extremely low during periods of little rain. The stream suffers from heavy sewage pollution and was recently excavated for a sewer line.

Russell Fork from 400 yards Downstream of Haysi High School to Rt. 80 Bridge at Birchleaf USGS Guage

Although much of this reach consists of long, sand bottom pools, it contains many riffles, runs, and shallow pools which provide excellent physical habitat for mussels. Much of the substrate consists of an aggregate of sand, gravel, and cobble. Numerous banks of water willow anchor the substrate providing stable mussel habitat. This reach is the widest and flattest sampled during the survey. Average width is approximately 70 feet and gradient an estimated 10 feet per mile. Riverbanks are relatively low, about 10 to 20 feet high, and well vegetated with mature shade producing trees. Some localized sanitary pollution is evident, and the lower gradient allows sediments from

upstream strip mines to settle in slackwater areas. Two hydraulic sand/coal dredging operations are located in deep pool areas and likely cause turbidity problems when in use.

Frying Pan Creek

Frying Pan Creek is a small, 10 foot wide stream with almost pure sand substrate. The bottom contour is uniformly flat and water depth averages no more than 6 inches during low flow periods. The channel is well entrenched in high banks and reportedly carries large discharges during periods of high runoff. Frying Pan Creek joins the Russell Fork just downstream of the Birchleaf USGS guage.

Russell Fork from Rt. 80 Bridge to 300 yards Upstream of Farrell Branch

This headwater reach of the Russell Fork exhibits extremely diverse character. Width, depth, substrate composition, and other factors vary throughout. Gradient averages about 14 feet per mile but progressively increases upstream. Small pockets of clean, high quality, mixed sand and gravel substrate exist at various sites. These are interspersed, however, with significant lengths of channel dominated by boulders, bedrock, or large broken rock. Most pools in this reach are found in sharp channel curves and have bedrock or broken rock substrates. Two sand bottom pools are located in a straight section of channel near Viers. During late summer, water depth and velocity become particularly low and the substrate of some broader riffles and runs are partially exposed.

This reach of the Russell Fork is paralleled by SR 605. Vegetation is generally sparse on the right bank where the roadbed encroaches. The left bank is generally well vegetated with mature timber.

Previous Surveys

The aquatic resources of the Big Sandy basin have historically received little attention from the scientific community. Aquatic surveys are scarce and most are outdated. A few surveys, limited in scope and specific to particular sites, have been completed but primarily within the lower Levisa Fork basin. These were performed in response to specific projects and are not comprehensive.

A list of aquatic macroinvertebrates known to have been collected from the Big Sandy River basin was compiled by Dr. Gerald L. DeMoss in his report "The Macroinvertebrates of the Big Sandy River Basin, with Special Emphasis on the Levisa Fork Drainage" prepared for the Huntington District in 1981. The literature search performed by Dr. DeMoss revealed recorded collections of very few mollusk species in

the Big Sandy basin. Dr. DeMoss concluded that "The paucity of references . . . suggests that these forms have been greatly reduced within the basin." Although it is quite likely that molluscan populations have been greatly reduced due to various forms of pollution and stream modification, it is more likely that the records reflect the relatively small amount of research effort expended in the region. Several recent (1983) surveys by the FWS in the lower Levisa Fork basin have revealed substantially large and diverse populations that continue to persist in spite of perturbations.

Within the immediate project area, only one mussel survey is known to have been conducted prior to this study. In 1983, Dr. Ralph Taylor intensively surveyed the Russell Fork mainstem from Haysi, Virginia, to the community of Bee and the McClure River from Haysi to Fremont (10 miles). Additional spot sampling was executed on the Russell Fork to Council, Virginia, and on a number of large tributaries. Dr. Taylor described the Russell Fork as potentially ". . . superb mussel habitat" based upon current, water depth, water clarity, substrate, and particle size. However, Dr. Taylor concluded that the invertebrate population was ". . . particularly depauperate." Dr. Taylor observed "Less than one dozen crayfish . . . during the entire study." He also indicates that "Fingernail clams and aquatic snails were absent . . .". Regarding bivalves, Dr. Taylor collected only 10 live mussels, Lampsilis radiata siliquoidea, in the Russell Fork. Twenty-six relic shells and two fresh dead Lampsilis ovata ventricosa were also collected in Russell Fork. In the McClure River, six live Alasmidonta marginata and two L. r. siliquoidea were collected. Corbicula species were reported to be abundant in the McClure River.

Methods and Procedures

The subject survey was conducted during the period October 2 through 6, 1984. The mainstem of Russell Fork was intensively surveyed from the Skeggs Hole railroad bridge upstream to Splashdam, and from Haysi upstream to Murphy. A significant reach from Splashdam to Haysi was not sampled due to sewer line construction taking place within the main channel. Most potential mussel habitat had been destroyed in this reach and collection of any surviving mussels was impossible due to extremely high turbidity levels.

The McClure River was intensively surveyed from its mouth upstream to Camp Creek, approximately 4,000 linear feet. The lower 2,000 feet of Pound River channel (J.W. Flannagan Reservoir tailwater) was also intensively surveyed beginning at its juncture with the Russell Fork and working upstream. All minor tributaries within the area were observed to determine the suitability of substrate and flow to support freshwater mussels. Suitable habitat located in several tributaries

(Crooked Branch, Lick Creek, Frying Pan Creek) was subsequently surveyed in conjunction with the mainstem survey.

Water clarity was excellent during the survey period and mussels were generally located visually and collected by hand. Siphons and/or the posterior end of shells were observed in the substrate, often with the aid of glass bottom buckets, and pulled from the substrate material. Mussels were located in heavily vegetated streambanks by "grubbing" through the root entangled substrate, locating the mussels by touch.

Specimens were immediately identified on site and returned to the substrate. Several relic representatives of each species group were retained. Species numbers and their locations were recorded on copies of U.S. Geological Survey topographic maps. Additional information was recorded regarding substrate, flow, water depth, habitat type, visible pollution, and age and general condition of mussels.

Findings

Particular reaches of the Russell Fork appear to provide excellent habitat for freshwater mussels. Species diversity and total numbers of mussels were found to be lower, however, than anticipated by the investigators. A total of 434 live specimens representing three Unionid species were collected (Table 1). Representatives of the genus Corbicula, the introduced Asiatic clam, and the genus Sphaerium, the indigenous fingernail clam were also collected. The majority of Unionids (360 of 434) were collected in the channel segment between Haysi High School and the Rt. 80 bridge at the Birchleaf USGS guage station, where substrate composition, substrate stability, and gradient were particularly suitable. Most specimens in this reach were found to inhabit a sand/gravel substrate pocked with occasional cobble-sized rock, or in shoreline areas stabilized by water willow. In other reaches, stable sand/gravel substrates with continuous flow generally provided the habitat. Pools and unstable substrates such as sand produced few mussels.

The High School to SR 80 reach revealed 10 beds (more than 15 mussels grouped together) of L. r. siliquoidea. More than 60 individuals were found in one bed. L. o. ventricosa, which occurred in small numbers, were scattered, and the largest group included only 4 individual specimens. Only one live A. marginata was collected, that from the McClure River. Three additional relics were found, one from the Birchleaf area of the Russell Fork.

The asiatic clam Corbicula was found to be prevalent in Russell Fork downstream of the Pound River, and in the lower McClure River. A few specimens were collected from Russell Fork between the Pound River and

Table 1. Species and Number of Mussels Collected From the Survey Area, Russell Fork and Tributaries, Virginia

Species	Live	Relic
Lampsilis radiata siliquoidea	414	45
Lampsilis ovata ventricosa	19	11
Alasmidonta marginata	1	3
	434	59

Splashdam. Fingernail clams (Sphaerium sp.) generally had the same distribution and range as the Lampsilis species.

Tributary streams, other than the McClure and Pound River, were found to be unsuitable mussel habitat. Tributaries were too small, generally less than 10 feet wide and 6 inches deep, and flow becomes particularly low during late summer. Some tributaries, such as Frying Pan Creek, Lazarus Branch, Crooked Branch, and Lick Creek, had pure sand bottoms which appear to shift frequently. A single live L. r. siliquoidea and one valve of the same species were collected near the mouth of Frying Pan Creek.

The Pound River does have suitable substrate and sufficient flow with augmented releases from Flannagan Reservoir. There was no evidence, however, that Unionid mussels inhabit the survey reach.

The lower McClure River population of Unionids appears to be quite small. A total of only 7 live specimens were collected on this stream.

Although suitable substrate was found in the headwaters of the Russell Fork, no mussels were found upstream of a point 300 yards upstream of Farrell Branch. The stream was surveyed to the community of Murphy, approximately 2 miles upstream from the last collection, and then discontinued.

Overall, the condition of the mussel specimens collected appeared to be excellent. Periostracum and calcium carbonate shell layers showed little erosion, even on older specimens. No pollutants were noted to have accumulated on shells. With the exception of A. marginata, of which only adults over four years old were collected, the populations appeared to be fairly well balanced in age. Several large L. r. siliquoidea were found to be over 10 years of age. A number of both L. r. siliquoidea and L. o. ventricosa were slightly over one year old.

Various other aquatic invertebrates, including crayfish, snails, mayflies, water pennies, and hellgrammites, were quite prevalent in the Russell Fork. Particularly large concentrations were observed upstream of Haysi where substrate and flow was most suitable.

Specific findings by survey reach are recorded below.

Skegg Tunnel Railroad Bridge to Pound River Mouth (Figure 2)

Flowing water sections of this reach provided relatively little suitable substrate. Where large rock was not dominant, the substrate was heavily scoured. Four live L. r. siliquoidea 3-3½ inches in length were collected in a small parcel of stable substrate anchored by water willows. Corbicula was common in all flowing

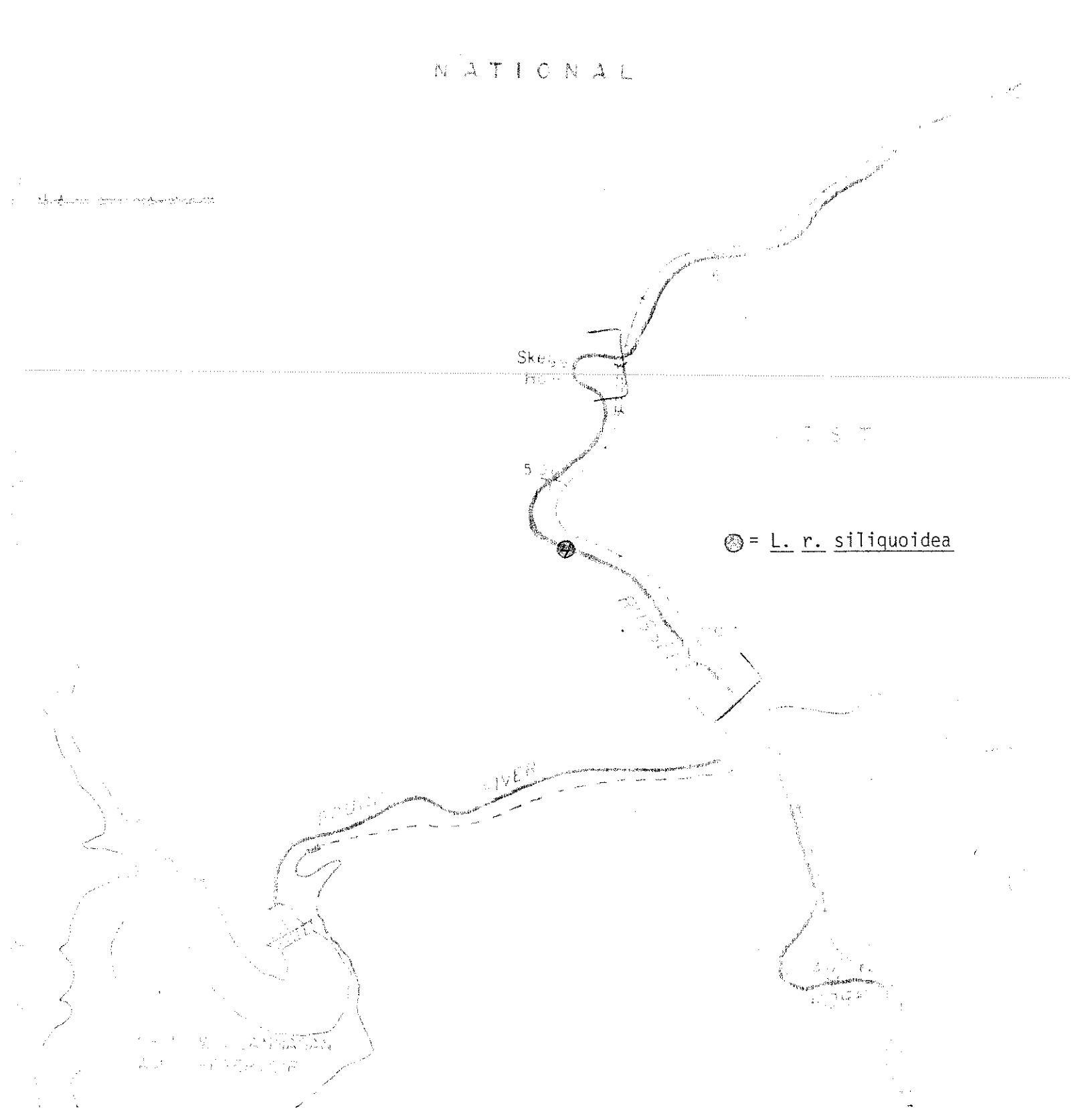


Figure 2. Location of Freshwater Mussel Collections from the Russell Fork, Skegg Tunnel Railroad Bridge to Pound River Mouth.

water habitat but other invertebrates were scarce. It is likely that the coldwater discharge from Flannagan reservoir and related fluctuating discharge velocities inhibit invertebrate production in this reach.

Lower Pound River (Figure 3)

No mussels and few invertebrates were observed in the Pound River despite suitable substrate. Uniformly low temperatures, lack of nutrients, and extreme discharge fluctuations likely restrict the feeding, reproduction, and development of invertebrates and fish in this area. It is likely that the temperature does not become sufficiently warm to allow mussel recruitment to successfully occur. Sudden drops in water temperature reportedly cause abortion of egg masses (Matteson, 1948). Consistently low water temperature reportedly dulls the responses of glochidia (Arey, 1921) and represses development of a mussel's digestive style (Allen, 1921).

Russell Fork from Pound River to Splashdam (Figure 4)

Gradient and related water velocity appear to be slightly excessive in this reach to support freshwater mussels in the pockets of suitable substrate that exist. Pollution from coal facilities and sewage outfalls is also a likely limiting factor. No live mussels other than Sphaerium sp. and a few Corbicula were observed. Relic specimens of L. r. siliquoidea (10½) and L. o. ventricosa (2) were collected, but, most were near the upstream limit of the reach. All of the relics were young specimens, only two exceeding two inches in length. All were in excellent condition and apparently had died recently. It is probable that these specimens died as a result of sewer line construction or pollution sources upstream and had recently washed downstream.

Splashdam to 400 yards Downstream of Haysi High School (Figure 5)

This reach was not sampled due to ongoing sewer line construction within the stream. This reach likely was inhabited by significant populations of mussels prior to construction if pollution (e.g. Haysi sewage) had not previously impacted the stream.

McClure River from Mouth to Camp Creek (Figure 6)

Live mussels were collected within a stable 500 yard segment beginning at a bridge 300 yards upstream of the mouth. The collection included 5 live L. r. siliquoidea, 1 L. o. ventricosa, 1 A. marginata and a number of Corbicula. No mussels were collected in the lower 300 yards of stream. Quality substrate previously existed at an old ford, but has recently been dredged for gravel. Upstream of the ford, 6 L. r. siliquoidea and 2 A. marginata relics were collected where large boulders begin to dominate the substrate. These

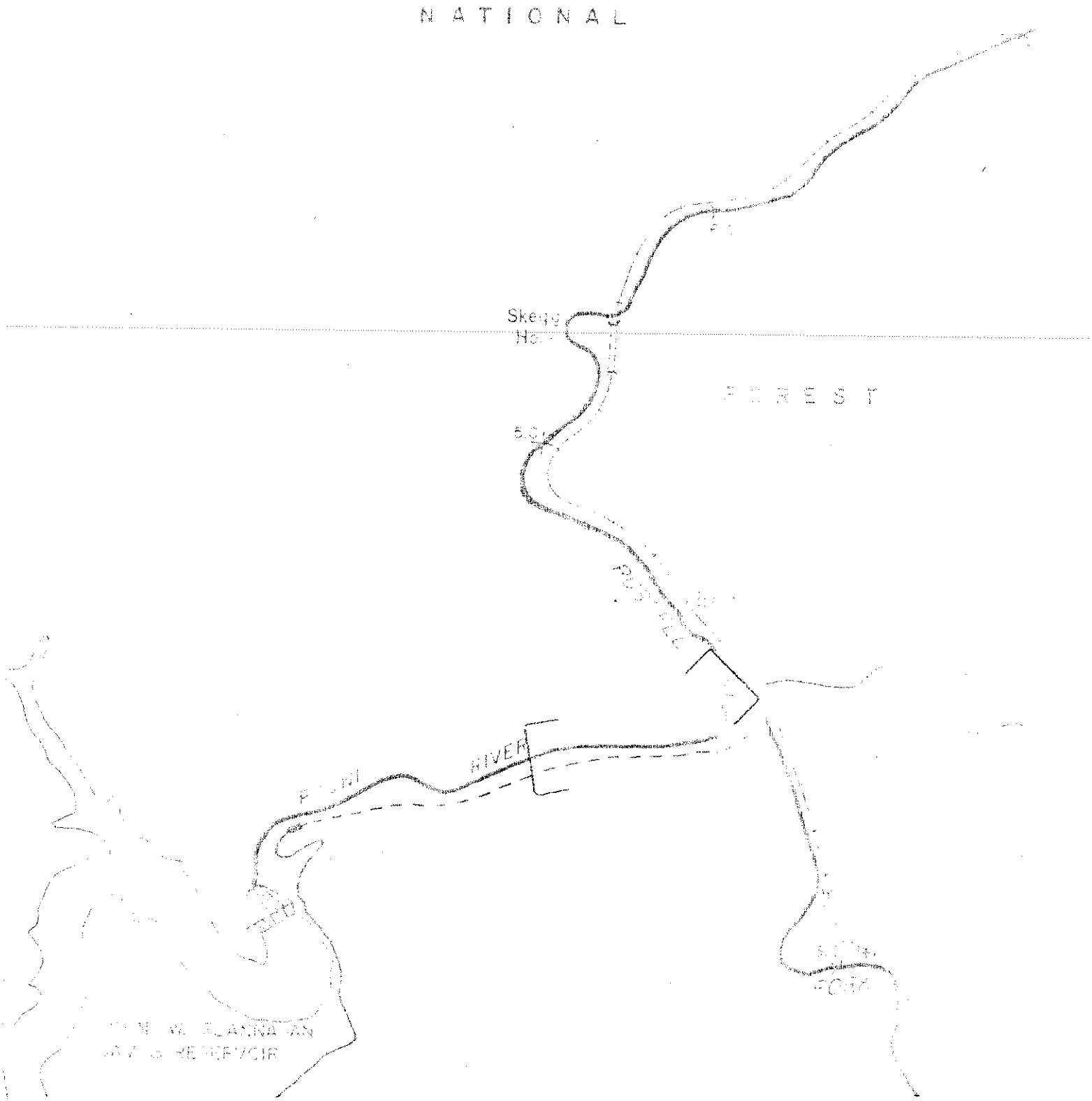


Figure 3. Survey Reach -- Lower Pound River.

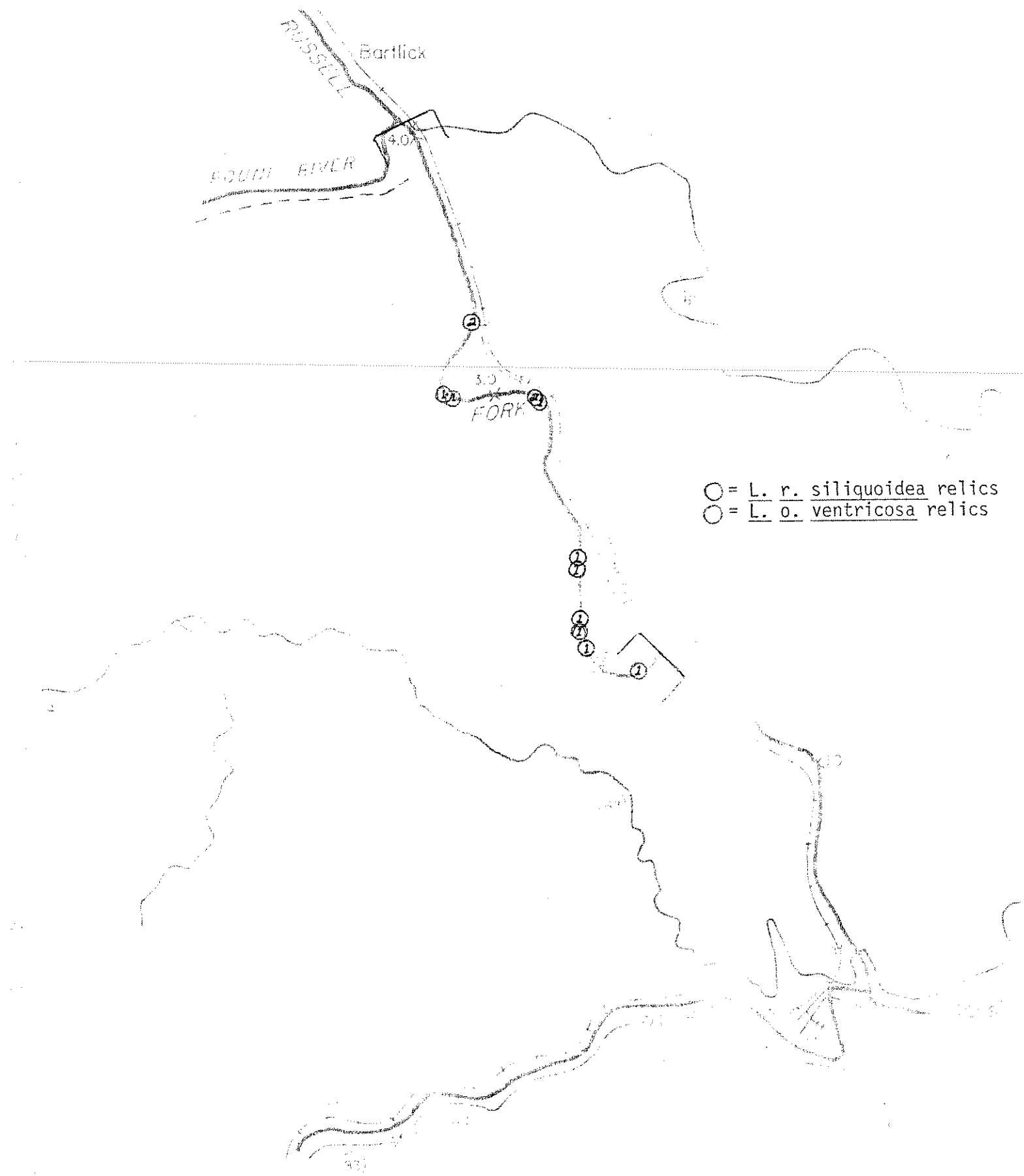


Figure 4. Location of Freshwater Mussel Collections from the Russell Fork, Pound River to Splashdam.

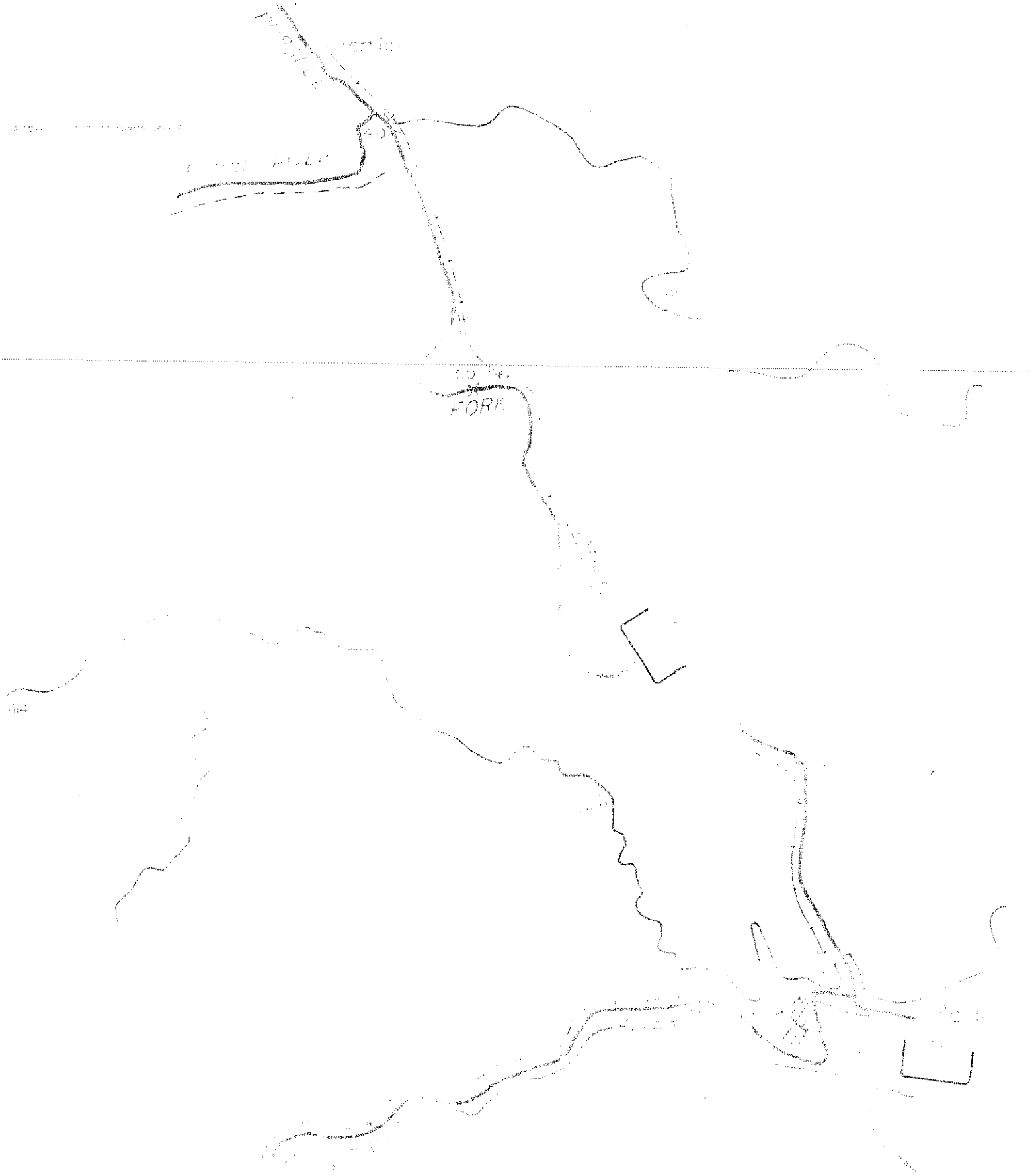


Figure 5. Survey Reach -- Russell Fork, Splashdam to 400 yards Downstream of Haysi High School.

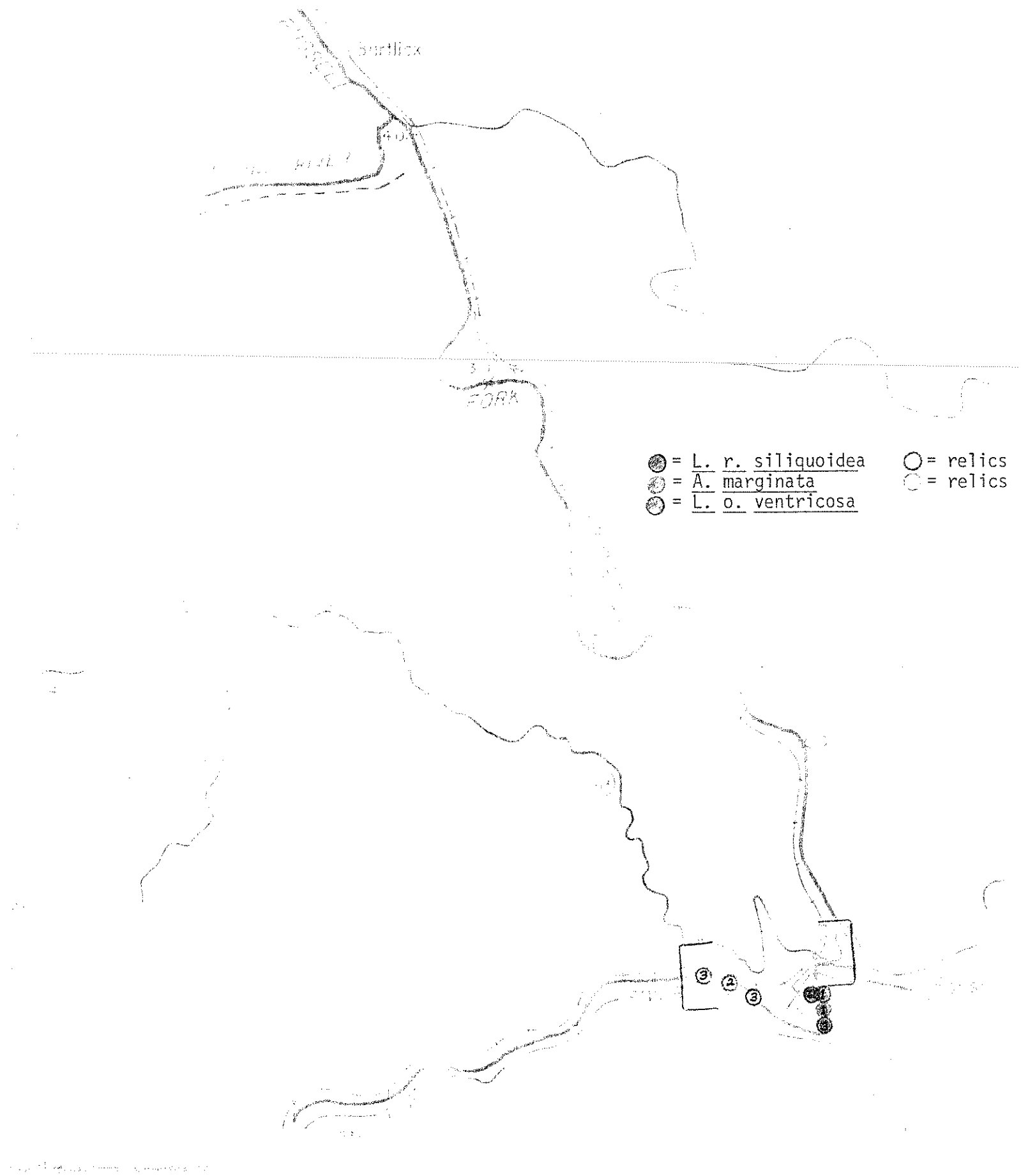


Figure 6. Location of Freshwater Mussel Collections from the McClure River, Mouth to Camp Creek.

specimens likely washed downstream from more suitable habitat. This reach suffers some adverse effects from scouring, sewage, and various sediments.

Russell Fork 400 yards Downstream of Haysi High School to Rt. 80 Bridge at Birchleaf USGS Gauge (Figure 7)

This reach contained the highest quality habitat and apparently supports the bulk of the total mussel population within the survey area. All of the substantial mussel beds discovered during the survey were in this area or immediately upstream. Although the water suffers from some sediment and sewage pollution, flow keeps a number of riffle and run areas with stable sand/gravel/cobble substrate sufficiently clean. Nearly all shoreline areas with water willow were productive. Live specimens found included 353 L. r. siliquoidea, and 9 L. o. ventricosa. Relic specimens included 11½ siliquoidea, 3 ventricosa, and 1 A. marginata, the only marginata specimen taken from the Russell Fork during the survey. A total of 10 L. r. siliquoidea beds with more than 15 mussels in close proximity were located, indicating that reproduction is fairly secure. One bed included 61 mussels. The reproductive status of ventricosa appears more tenuous, however, in that the largest group included only four specimens. The age diversity of both L. r. siliquoidea and L. o. ventricosa specimens was good, however, indicating successful reproduction over time and within the past 2 years.

Frying Pan Creek (Figure 7)

The homogenous sand substrate and unpredictable flow of lower Frying Pan Creek is unsuitable for Unionid mussels. Near the mouth 1 live siliquoidea and 1 relic of the same species were collected, but they are not likely from a reproducing Frying Pan population. It is more likely that these specimens were carried to the stream by migrating host fish bearing glochidia from the Russell Fork.

Russell Fork Rt. 80 Bridge to 300 yards Upstream of Farrell Branch (Figure 8)

Mussels collected in this reach were irregularly distributed. Concentrations of mussels were found in a series of 4 riffles upstream of SR 80 (18 L. r. siliquoidea, 4 L. o. ventricosa) and in curves near Farrell Branch (18 L. r. siliquoidea, 2 L. o. ventricosa), but only 15 live L. r. siliquoidea and 5 live L. o. ventricosa were collected over the remainder of the reach. No mussels were collected beyond a point 300 yards upstream of Farrell Branch although suitable substrate exists and was intensively surveyed to Murphy, 2 miles further upstream (Figure 9).

A relatively high ratio of relics to live specimens was uncovered in this reach, possibly indicating some recent episode that resulted in

Figure 7. Location of Freshwater Mussel Collections from the Russell Fork, 400 yards Downstream of Haysi High School to Route 80 Bridge at Birchleaf USGS Gauge.

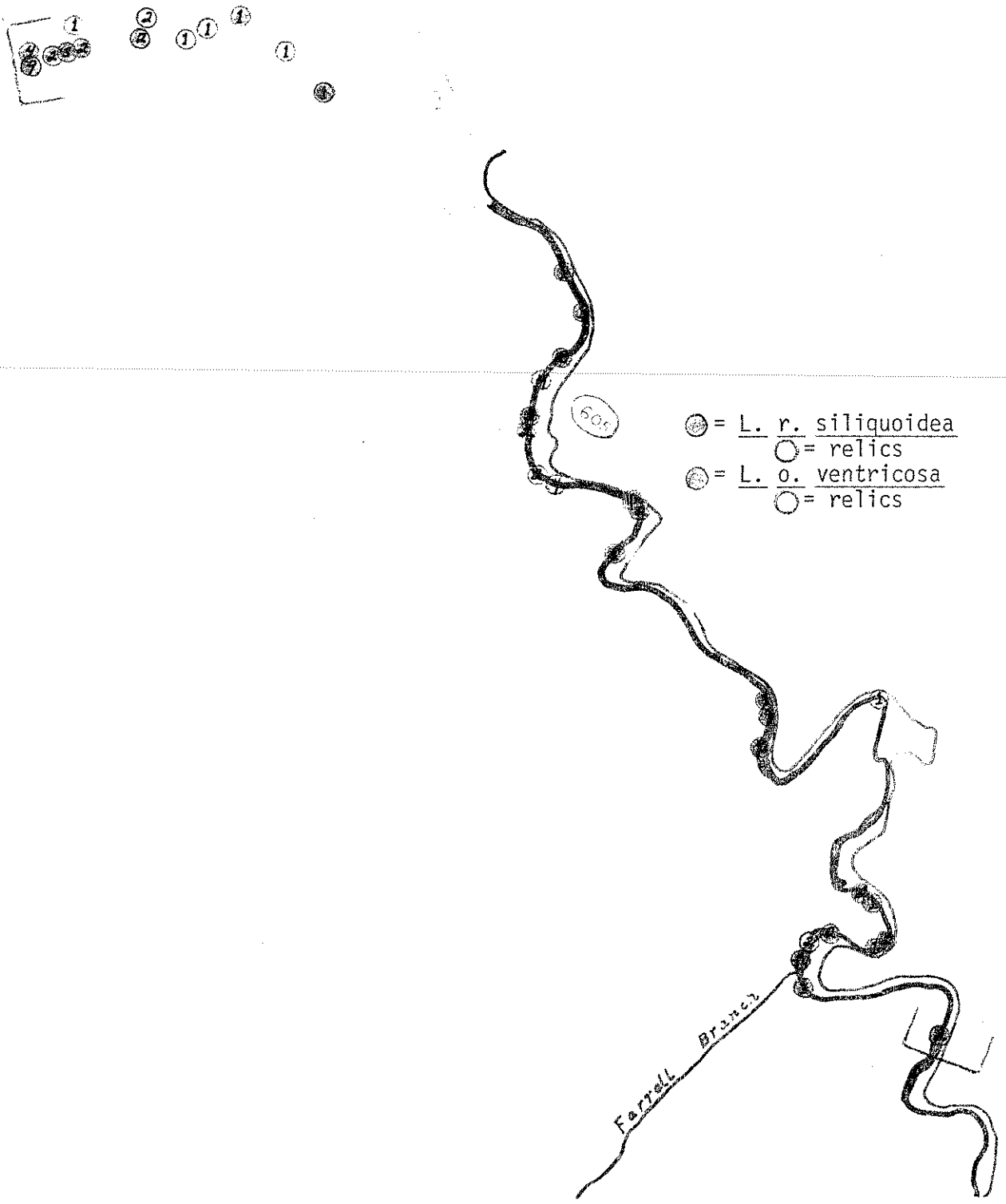


Figure 8. Location of Freshwater Mussel Collections from the Russell Fork, Route 80 Bridge to 300 yards Downstream of Farrell Branch.

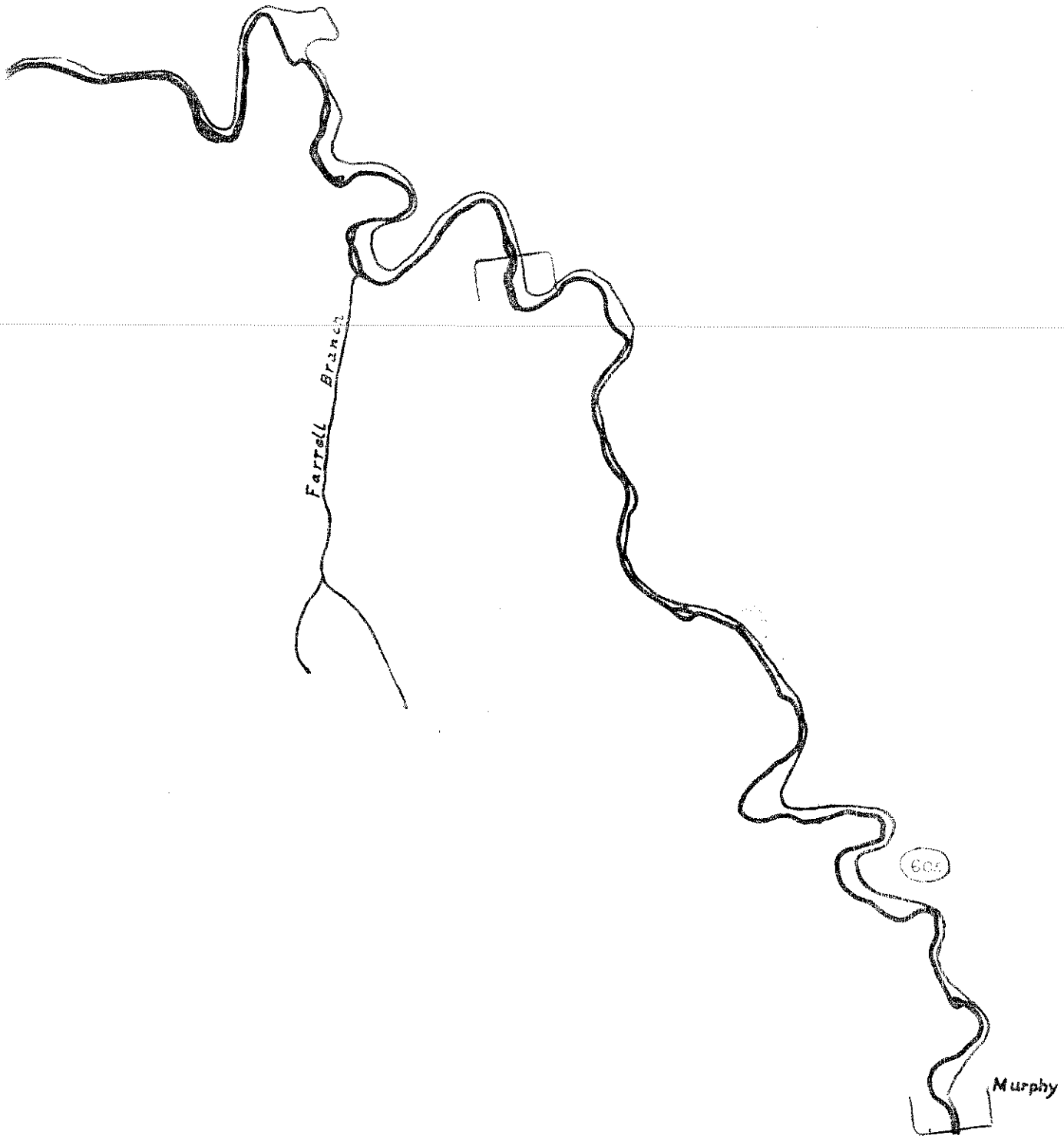


Figure 9. Survey Reach -- Russell Fork, 300 yards Upstream of Farrell Branch to Murphy.

the death of mussels. The data reveals that 5½ L. o. ventricosa relics were collected compared to 11 live specimens, and 14 L. r. siliquoidea relics compared to 51 live specimens. Age distribution appeared to be fair, but few specimens older than 6 years were observed.

Conclusions

Although diversity is relatively low, it appears that viable populations of mussels exist within the survey area. Age distribution, size and number of beds, and overall condition of specimens indicate that reproducing populations of L. r. siliquoidea and L. o. ventricosa exist in the Russell Fork between the Haysi High School and the Birchleaf USGS guage. It is likely that a substantial reproducing population recently existed on the Russell Fork between Haysi and Splashdam based upon the number of relic shells found immediately downstream and the quality habitat which apparently existed prior to sewer line construction. The present status of beds in this reach is unknown.

No reproducing population of A. marginata is believed to exist within the survey area. Live specimens collected on the lower McClure River and the single relic specimen from the Russell Fork probably represent individuals spawned on the upper McClure River and carried to other locations by host fish. Specimens of L. r. siliquoidea and L. o. ventricosa collected above SR 80 (Birchleaf Guage) and in the Bartlick area likewise were probably not spawned in the immediate area. It was noted that two concentrations of mussels upstream of SR 80 at the USGS guage and Farrell Branch were collected near significant riffle complexes which likely serve as effective fish barriers and/or fish spawning sites where host fish congregate and drop glochidia, some of which survive and develop. These mussel groups may be sufficiently large, however, that some local mussel reproduction does occur.

For the most part, habitat with a suitable combination of stable substrate, flow, and water temperature, is inhabited by mussels. The lower Pound River has suitable substrate but water temperature is consistently low and flow is occasionally excessive to the point of eroding the substrate. The nutrient level of the water is also particularly low. In the Russell Fork, stable substrate is scarce from Splashdam to the Skegg railroad tunnel, and overall gradient appears to be excessive, preventing mussels from establishing in this area. Upstream of SR 80, substantial portions of the channel appear to have suitable substrate composition. It is not abundantly clear as to why more mussels are not presently inhabiting this area. Possible limiting factors include gradient, excessive flows, and low water temperature. Gradient progressively increases upstream of the SR 80

bridge exceeding 14 feet per mile. Seasonally high discharges of water and related high water velocities appear to frequently shift and rearrange the substrate in many locations. It is notable that during a 1982 fish survey conducted by the FWS, a distinct and relatively sudden increase in gradient and decrease in overall size of the stream was recorded at a point 3,000 feet upstream of the last mussel collection. It is also in this area that water temperatures begin to show significant decline. The portion of the Russell Fork upstream of Bee is considered to be coldwater, and is stocked by the VACGIF with trout. These factors may work directly against the establishment of significant mussel populations in this area, or indirectly by affecting host fish species. It is also possible that the nutrient load is low due to the limited size of the watershed and thereby insufficient for growth and development to occur.

It is the opinion of the authors that relatively few mussels have likely ever inhabited the Russell Fork upstream of the Birchleaf USGS guage or downstream of Splashdam. The populations have likely always been concentrated between the gauge and Splashdam where substrate, gradient, flow, and temperature has been suitable. The McClure River and Lower Pound River also probably supported significant populations before flows were modified by impoundment and floodplain development. The Russell Fork population was probably at one time much larger and somewhat more diverse before watershed modifications increased surface runoff and therefore seasonal stream discharges and velocities which shift substrate materials. Pollutants, in the form of sediments and sewage, also likely have reduced the population as certainly have physical activities such as sand/coal dredging and construction of sewer lines, flood channels, bridges, and other modern features of civilization.

Implications for Proposed Flood Control Activities

Construction of a dam on the Russell Fork, either a permanent impoundment or dry flood retarding structure, would effectively eliminate any mussels upstream of the dam. It is presently proposed that a structure be built at SM 29.8 near Viers and the current upstream range of the Russell Fork population would be decreased by about 3½ miles. The greatest concentration of mussels would not be directly affected.

Operation of the structure could either magnify or reduce apparent limiting factors having positive or negative impacts on the larger concentrations of mussels downstream. Releases from the structure could affect water volume and velocity, water temperature, and sedimentation for many miles downstream of the dam itself.

Periodic flushes of water more than 6° F colder than the receiving waters could induce thermal shock in mussels and other aquatic organisms. Their ability to react simultaneously to the high velocities would be impaired by the cold water.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Post Office Box 845
Cookeville, TN 38501

May 13, 1985

Colonel Robert B. Wilson
District Engineer, U.S. Army
Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701

Dear Colonel Wilson:

The attached report provides qualitative and quantitative information regarding populations of freshwater mussels in the area of the proposed Haysi Reservoir, Russell Fork watershed, Buchanan and Dickenson Counties, Virginia. This survey was performed under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and in accordance with the Fiscal Year 1985 Fish and Wildlife Service/Huntington District letter of agreement for funding Coordination Act activities. The information was compiled and analyzed by the Fish and Wildlife Service to provide baseline information regarding the size, diversity, and general condition of mussel populations within the area of project influence. The information is intended to assist the Service and Corps of Engineers in assessing and mitigating potential impacts of the Haysi project.

The assistance of your staff in the planning and execution of this survey is appreciated.

Sincerely,

David R Parsons

David R. Parsons
Acting Field Supervisor

DRP/RTB/r

Attachment

cc: VA Commission of Game and Inland Fisheries, Bob Wollitz, Route 5, Box 451-A, Marion, VA 24354