

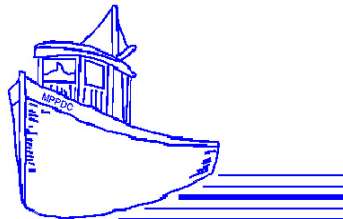
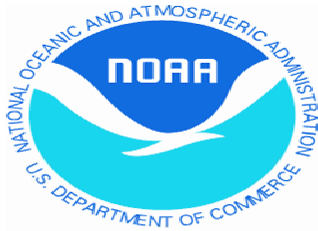
DRAGON RUN SPECIAL AREA MANAGEMENT PLAN

Aquatic Living Resources Inventory: Fish and Macroinvertebrate Communities

Prepared By

Stephen P. McIninch, PhD
Greg C. Garman, PhD
Leonard A. Smock, PhD
William C. Stuart

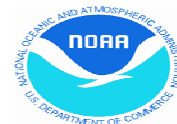
Virginia Commonwealth University
Center for Environmental Studies &
Department of Biology
1000 W. Cary Street
Richmond, VA 23284
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The views expressed herein are those of the author(s) and do not necessarily reflect the views of DCR, NOAA or any of its subagencies.

Introduction

The distinctive watershed that gathers to form the Piankatank River is a collection of spring-fed streams, tributaries supported by surface runoff, and numerous tidal and nontidal wetlands. The character of the Dragon Run watershed ranges from brackish to freshwater and may be either tidal or nontidal. The approximately forty miles of stream flows through four Virginia tidewater counties and relatively undisturbed coastal landscapes (DRSC 1996). This unique ecological treasure was acknowledged in 1974 when the Smithsonian Institution ranked Dragon Run system the second most important ecological priority of 232 ecologically significant areas in the Chesapeake Bay drainage (Jenkins 1974). Over the past 30 years landowners, state and local officials, biologists, and other concerned parties have gathered in meetings and symposiums in an attempt to understand, manage and afford protection to the Dragon Run system. The Dragon Run Steering Committee held its first meeting in early 1985 and with support from the Middle Peninsula Planning District Commission and the Chesapeake Bay Foundation remains active and committed to the protection of this unique natural resource (DRSC 1996).

Despite the awareness of its unique beauty and ecological importance, early efforts to have the Dragon Run listed under the Scenic Rivers Act of 1970 failed and, until recently, access to accurate data *re:* aquatic biodiversity in the Dragon Run system was very limited. Merriner, et al. (1976) published an account of seasonality and abundance of fishes in the Piankatank River based on trawl collections during 1970 and 1971. Most of the study sites were in the lower and middle river with only one or two sites representing the Dragon Run system. Merriner, et al. (1976) listed 21 resident and migratory fishes in the Dragon Run system and presented a general – but incomplete – account of the system's ichthyofauna. Jenkins and Burkhead (1994), in their account of the freshwater fishes of Virginia, supplemented the Merriner et al. (1976) data with records from nine additional collections to compile their description of the fisheries resources of the freshwater Piankatank River drainage. This report, and the attached database, documents the most recent and comprehensive inventory of the stream-dependent, fish and macroinvertebrate communities in the Dragon Run system undertaken to date.

The objective of this study was to conduct a complete and comprehensive inventory of stream-dependent, living resources within the Dragon Run watershed in order to enhance the protection and management of the watershed. The reported inventory is catalogued and archived using GIS-based software for ease of mapping, flexibility among users, and long-term data manipulation and analysis. This written report is accompanied by an extensive, GIS-based, ACCESS database on CD-ROM. The living resources recorded during this study include freshwater, diadromous, and estuarine fishes, aquatic macroinvertebrates, and freshwater bivalves (primarily unionid mussels).

Methods

Study sites are selected and living resources surveyed/collected following standard protocols for quantitative collections (See Standard Operating Protocols; [Appendix I](#)). Fishes are enumerated and examined for anomalies following capture. Macroinvertebrates are subsampled from a composite and identified in the laboratory. Voucher specimens of macroinvertebrates and fishes are maintained at Virginia Commonwealth University. Mussels are surveyed qualitatively (i.e. specimens are collected but not enumerated). Habitat evaluations are made at each collection site visit using EPA rapid assessment habitat analysis.

Completed data sheets (field sheets for fishes; laboratory identification sheets for macroinvertebrates) are completed, the data is entered into appropriate databases for data storage and statistical analyses. Data gathered for this study is presently based in both Microsoft Excel spreadsheets and Microsoft Access databases as well as in a FORTRAN format readable by CANOCO® statistical software package. Georeferenced site locations and faunal data are also mapped in ArcGIS compatible files.

Fish collection data was examined for normality of distribution, transformed using log+1 transformations, and subjected to a Detrended Correspondence Analysis (DCA) using CANOCO software package.

Results

To date over 30 sites have been surveyed quantitatively for aquatic living resources. Site locations have been georeferenced using Trimble GPS units and may be viewed in the enclosed figures (Fig. 1-3) produced from WMF images. Results of the most recent fish, macroinvertebrate, and bivalve collections are presented in [Appendices II, III, and IV](#), respectively. Site information on county locality, nearest road crossing, number of fish species present, number of macroinvertebrates present, and mussel and amphibian data in shapefiles may be viewed using ESRI® ArcGIS software.

Fishes

Electrofishing collections during 2002 and 2003 within the Dragon Run watershed documented 50 species representing 20 families (Table 1). Over the past ten years, Dragon Run collections made by Virginia Department of Game and Inland Fisheries (VDGIF) and Virginia Commonwealth University have added twelve freshwater fish species to the inventory of the watershed and documented the presence of six estuarine fishes in the freshwater (< 0.5 ppt) portion of the system, compared to the published accounts of Merriner et al. (1976) and Jenkins and Burkhead (1994). Our study is the first to report sheepshead minnow (*Cyprinodon variegatus*), spotted bass (*Micropterus punctulatus*) and blue catfish (*Ictalurus furcatus*) from the watershed.

Records tabulated and compiled in MPPDC 2001 by examination of the Virginia Fish and Wildlife information System of VDGIF note the addition of at least twelve other species that we consider to be reported erroneously. Included are two species that may use the system temporarily but there are no confirmed collections; Atlantic sturgeon and sea lamprey. Additional species that were reported as 'unconfirmed' and/or that we consider to be reported incorrectly include smallmouth bass, white bass, rosieside dace, glassy darter, fallfish, fathead minnow, rock bass, black bullhead, and common shiner. The 1996 reports by VDGIF of bridle shiner *Notropis bifrenatus*, are probably misidentifications of the closely related ironcolor shiner *N. chalybaeus*, which was documented for the system during the current study.

Additional questionable records include those that may be present in the system but we did not collect during this comprehensive survey. These include the *Alvordius* darters (shield and stripeback), mud sunfish, blacknose dace and spottail shiner. Blacknose dace and the two darters are predominately moderate upland species with sporadic distribution in some areas of the Coastal Plain. Because of the lack of connection to the Piedmont, the Piankatank River drainage would not be expected to hold a strong population of these upland species. If a small population existed in the Dragon Run, but was extirpated, it is unlikely that recolonization would take place.

The Dragon Run ichthyofauna is a mixed assemblage of mostly lowland, freshwater forms. An indication of the diversity of this assemblage is reflected by the number of families represented by a single species (13 of 20 families). The most speciose family is Centrarchidae (sunfishes), which includes small, lowland indigenous forms such as bluespotted and banded sunfishes (*Enneacanthus* spp.), larger fauna such as warmouth and pumpkinseed sunfish, and those that were introduced to the system many years ago (largemouth bass, bluegill, black crappie).

Three of the four anadromous clupeid fishes present in the Chesapeake Bay were noted in this study: *Alosa sapidissima* (American shad), *A. aestivalis* (blueback herring), and *A. pseudoharengus* (alewife). The status of hickory shad (*A. mediocris*) in the system is unknown. Although not present in their species table, Merriner et al. (1976) notes the capture of the hickory shad within the text of their manuscript. Jenkins and Burkhead (1994) note, without further discussion, the absence of the species in the watershed. Because of the amount of preferred spawning substrate for both American and hickory shad may be limited in the smaller Piankatank River, compared to other coastal drainages, it is likely that their abundance is relatively low. The catadromous American eel is quite common in streams and rivers of the drainage and are an integral part of the Dragon Run watershed. Other diadromous fishes such as striped bass *Morone saxatilis* are found in the system, as are estuarine-dependent migrants such as American sole, red drum, and white perch. These species represent an important component of the fish fauna that is highly dynamic, both spatially and temporally (Garman and Macko 1998).

Due to the close proximity of the Dragon Run watershed to the saline Piankatank River drainage, some of the fishes captured were estuarine or euryhaline fishes that may be part-time residents or are merely transients in the tidal freshwater portions of the Dragon Run watershed (Garman and Nielsen 1992). Such species collected during this study were sheepshead minnow

Cyprinodon variegatus, spot *Leiostomus xanthurus*, Atlantic menhaden *Brevoortia tyrannus*, bay anchovy *Anchoa mitchilli*, and inland silverside *Menidia beryllina*. Severe drought conditions during the period June-September, 2002 may have contributed to the relatively large number of estuarine-dependent and transient marine fishes collected by this study. The longer-term consequences of the 2002 drought-of-record on fish assemblage structure and distribution of invasive species should be the focus of on-going monitoring in Dragon Run.

Members of what may be considered a tidal/nontidal freshwater coastal river assemblage include American eel, longnose gar (*Lepisosteus osseus*), and large catfishes such as the native white catfish and introduced channel and blue catfishes. Diadromous fishes are often included in this grouping due to their part-time use of the system as a migration corridor between spawning habitats and coastal marine environments. Some minnows, such as the introduced common carp and indigenous satinfin shiner and eastern silvery minnow, may be characteristic of larger river systems. In addition, yellow perch and some of the sunfishes, including largemouth and spotted basses and redear sunfish are typical of larger aquatic systems.

Members of the smaller tributary community/assemblage that is most commonly found throughout the Dragon Run watershed include many of the coastal plain endemic fishes common throughout the physiographic province in the mid-Atlantic States. Indigenous fishes such as the eastern mudminnow, redbfin and chain pickerels, pirate perch, creek chubsucker, and the brown and yellow bullheads are often common components of coastal stream fish assemblages. Sunfishes also make up a significant component of these coastal plain communities and include both indigenous and introduced members. Coastal plain sunfishes included the bluespotted and banded sunfishes (*Enneacanthus gloriosus*, *E. obesus*, respectively), the warmouth (*Lepomis gulosus*), redbreast and pumpkinseed sunfishes (*L. auritus* and *L. gibbosus*, respectively). Bluegill and redear sunfishes (both introduced to the system) were also collected frequently by this study.

There were a few sites where a small number of species exists that may be considered unique or rare. Least brook lamprey were found in only a few sites. This may be reflective of their preference for gravel substrate in their spawning sites and the paucity of such habitat in the Dragon Run system. Creek chub (*Semotilus atromaculatus*) have been reported from the system, but only rarely. This species is usually more tied to the Piedmont province and is probably not common anywhere in the Piankatank drainage. Two other species, margined madtom *Noturus insignis* and comely shiner *Notropis amoenus* are more commonly associated with uplands (piedmont) or upper coastal plain habitats. The presence of these atypical species in the Dragon Run watershed may suggest that pockets of habitat exist that resemble that of a more upland area or that populations of these species have learned to adapt to a more lowland existence in the system. Such habitat heterogeneity contributes significantly to the substantial biodiversity represented by Dragon Run ecological communities.

Results of the Detrended Correspondence Analysis (DCA) are represented in Figures 4 and 5. Figure 4 show the distribution of species in ordination space as a result of catch per unit effort numbers of collections. Species were classified into seven groups and enveloped in Figure 5. Those that were found most frequently throughout the study and from a large variety of habitats were coined the 'ubiquitous' group. Some groups such as the diadromous, estuarine, and river

fishes were grouped together and are found on the far right side of the ordination diagram. Other species, such as the Coastal Plain endemics, are clustered away from others. It is worth noting that those fish species that are known to be introduced in the drainage are found to the right of the diagram along with the large river groups. This distribution may be reflective of the large predators introduced in the drainage (e.g. blue catfish) but others such as bluegill and largemouth bass are frequently found in smaller streams throughout the Chesapeake Bay drainage. This distribution pattern of introduced species, and their relatively limited occurrence of nonindigenous taxa throughout the drainage, suggests that the acidic, lowland streams and swamps of the Dragon Run system may be ecologically resistant to establishment of non-native and potentially invasive species.

The high diversity of fishes found in the Dragon Run system and the apparent lack of numerical dominance by introduced species is unusual for coastal plain stream and river systems—particularly tidal freshwaters—in Virginia. Based on the current inventory, the Dragon Run watershed remains one of the most ecologically intact aquatic ecosystems of the Chesapeake Bay Region (cp. Jenkins 1974). Several attributes of the Dragon Run fish assemblage, including high taxonomic richness, importance of coastal endemic forms, limited distribution of nonindigenous species, high densities of historically abundant native species (e.g. white catfish), and the prevalence of migratory and estuarine-dependent species, represent historical conditions (ca. 1900), prior to widespread degradation of coastal stream and river systems in Virginia. As such, the system is an invaluable example of reference conditions for a wide range of ecosystem restoration activities within the Chesapeake Bay Region.

Macroinvertebrates

The species of macroinvertebrates found at sites throughout the Dragon Run system were typical of species that occur in small- to medium-sized streams and swamps (both tidal and nontidal) on the Coastal Plain of Virginia. The documented species included taxa from all of the major groups of aquatic insects, mollusks and other typical aquatic invertebrate groups. Over one hundred taxa representing sixteen orders and sixty-six families were collected from the watershed (Table 2).

Although the macroinvertebrate species present were not necessarily unusual, taxonomic richness throughout the system was generally high. Some of the sites had very high taxonomic richness, compared to geomorphically and hydrologically similar streams elsewhere on the Virginia Coastal Plain. The number of EPT taxa (Ephemeroptera + Plecoptera + Trichoptera) throughout the system in general and at some of the sites in particular was outstanding, with the very unusually high number of 14 EPT taxa being found at one site. Other sites had a more typical taxonomic composition for slow-flowing coastal plain streams that included amphipods (Amphipoda), isopods (Isopoda), coleopterans (Coleoptera), and oligochaetes (Oligochaeta). Chironomids (Chironomidae) and blackflies (Simuliidae) were common throughout the system, the former in streams and swamps with low flow and the latter in streams with greater flow.

The number of unionid mussel species found in the system also was unusually high. Finding six species within the genera of *Elliptio*, *Utterbackia* and *Pyganodon* was unexpected. Other mollusks in the system included sphaeriid clams, which typically are very common in Coastal Plain systems, and the introduced Asiatic clam *Corbicula*.

Collector-gatherers were the most frequently encountered functional feeding group within the system, represented by most of the mayflies (Ephemeroptera), the chironomids, and a variety of other taxa. Filter-feeders also were common, in particular blackflies, mussels and clams. Shredders were common, including a number of taxa of stoneflies (Plecoptera), and caddisflies (Trichoptera). The abundance of collector-gatherer and collector-filterer guilds is typical in Coastal Plain streams, whereas the high number of taxa, and the frequency of occurrence, of shredders is not usual for most streams in this area.

The taxonomic composition and richness of the macroinvertebrate community are indicative of overall high water quality. Both taxonomic richness and EPT richness typically are considered critical indicators of water quality. The high values of these two parameters reflect likely high water and habitat quality in the system. In addition, many of the taxa found at the sites have low tolerance for poor water and habitat quality, further indicting high water and habitat quality throughout much of the system. Finally, the high taxonomic richness suggests that the Dragon Run system may be a “hot spot” for the biodiversity of aquatic macroinvertebrates within the Virginia Coastal Zone. Ongoing monitoring of selected sites is recommended.

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Table 1. List of fishes collected from Dragon Run watershed, Piankatank River drainage.

Merriner et al (1976) reflects only those fishes found or likely found in the freshwater and slightly brackish environs of the Dragon Run watershed. **Colored** species names indicate new record for the drainage.

	Codes	A	B	C	D
Lampetra aepyptera	LAE			X	X
Lampetra appendix	LAP			X	
Lepisosteus osseus	LOS	X	X	X	X
Anguilla rostrata	ARO	X	X	X	X
Brevoortia tyrannus	BTY			X	X
Dorosoma cepedianum	DCE	X		X	X
Alosa aestivalis	AAE	X	X	X	X
A. pseudoharengus	APS	X	X	X	X
A. mediocris	AME	X		X	
A. sapidissima	ASA	X	X	X	X
Anchoa mitchilli	AMI	X		X	X
Esox niger	ENI	X	X	X	X
E. americanus	EAM				X
Umbra pygmaea	UPY		X	X	X
Cyprinus carpio	CCA	X		X	X
Notemigonus crysoleucas	NCR	X	X	X	X
Rhinichthys atratulus	RAT		X		
Semotilus atromaculatus	SAT		X		X
Cyprinella analostana	CYA		X	X	X
Notropis amoenus	NAM		X		X
N. hudsonius	NHU	X	X		
N. procne	NPR		X	X	X
N. chalybaeus	NCH		X		X
Hybognathus regius	HRE			X	X
Erimyzon oblongus	EOB		X	X	X
Ictalurus punctatus	IPU			X	X
I. furcatus	IFU				X
Ameiurus catus	ACT	X	X	X	X
A. natalis	ANA			X	X
A. nebulosus	ANE			X	X
Noturus insignis	NIN			X	X
N. gyrinus	NGY		X		X
Aphredoderus sayanus	ASY		X	X	X
Cyprinodon variegatus	CVA				X
Fundulus diaphanus	FDI			X	X
F. heteroclitus	FHE			X	
Gambusia holbrooki	GHO			X	X
Menidia beryllina	MBE			X	X
M. menidia	MME	X			

Morone americana	MAM	X	X	X	X
M. saxatilis	MSX	X	X	X	X
Pomoxis nigromaculatus	PNI			X	X
Enneacanthus obesus	EBB			X	X
E. gloriosus	EGL		X	X	X
<i>Micropterus punctulatus</i>	MPU				X
M. salmoides	MSA	X	X	X	X
Lepomis gulosus	LGU		X	X	X
L. auritus	LAU		X	X	X
L. macrochirus	LMA	X	X	X	X
L. gibbosus	LGI	X	X	X	X
L. microlophus	LMI			X	X
Perca flavescens	PFL	X	X	X	X
Etheostoma olmstedi	EOL		X	X	X
Leiostomus xanthurus	LXA			X	X
Sciaenops ocellatus	SOC			X	
Trinectes maculatus	TMA	X		X	X

A = Merriner et al. (1976)

B = Jenkins & Burkhead (1994)

C = VDGIF collections (1990's)

D = Present Study

Table 2. List of macroinvertebrate taxa collected from Dragon Run watershed, Piankatank River drainage during 2002-2003.

Order Annelida

- Family Oligochaetae
- Family Hirudinea
- Family Erpobdellidae
- Dina* sp.

Order Amphipoda

- Family Gammaridae
- Gammarus* sp.

Order Isopoda

- Family Asellidae
- Caecidotea* sp.

Order Hydracarina

Order Hemiptera

- Family Corixidae
- Trichocorixa* sp.

Order Megaloptera

- Family Corydalidae
- Nigronia serricornis*
- Family Sialidae
- Sialis* sp.

Order Diptera

- Family Simuliidae
- Family Chironomidae
- Family Chaoboridae
- Chaoborus punctapennis*
- Family Ceratopogonidae
- Palpomyia* spp.
- Culicoides* spp.
- Probezzia* sp.
- Family Culicidae
- Culex* sp.
- Family Tipulidae
- Tiplua abdominalis*
- Pilaria* spp.
- Dicranota* spp.
- Hexatoma* spp.

Table 2 (cont.). List of macroinvertebrates collected from Dragon Run watershed, Piankatank River drainage.

Order Diptera (cont.)

Family Tabanidae

Chrysops spp.

Tabanus spp.

Family Empididae

Hemerodromia sp.

Order Ephemeroptera

Family Leptophlebiidae

Leptophlebia sp.

Paraleptophlebia sp.

Habrophlebia spp.

Family Baetidae

Baetis spp.

Family Ephemerellidae

Ephemerella spp.

Eurylophella temporalis

Family Ephemeridae

Hexagenia sp.

Family Caenidae

Caenis sp.

Family Heptageniidae

Stenonema modestum

Family Metretopodidae

Siphloplectron sp.

Order Trichoptera

Family Calamoceratidae

Anisocentropus sp.

Heteroplectron sp.

Family Hydropsychidae

Cheumatopsyche spp.

Hydropsyche spp.

Family Hydroptillidae

Oxythira sp.

Family Leptostomatidae

Lepidostoma sp.

Family Phryganaeidae

Ptilostomis sp.

Family Leptoceridae

Nectopsyche sp.

Family Limnephillidae

Hydratophylax argus

Table 2 (cont.). List of macroinvertebrates collected from Dragon Run watershed, Piankatank River drainage.

Order Trichoptera (cont.)

Family Limnephilidae (cont.)

Ironoquia spp.

Limniphilus sp.

Family Psychomyiidae

Lype diversa

Family Philopotamidae

Chimarra sp.

Family Polycentropodidae

Polycentropus spp.

Family Dipseudopsidae

Phylocentropus spp.

Family Leptoceridae

Oecetis spp.

Family Molannidae

Molanna blenda

Family Limnephilidae

Pycnopsyche spp.

Order Plecoptera

Family Capniidae

Allocapnia sp.

Family Nemouridae

Nemoura spp.

Prostoia sp.

Family Perlidae

Family Perlodidae

Clioperla clio

Isoperla spp.

Family Taeniopterygidae

Taeniopteryx spp.

Order Coleoptera

Family Dytiscidae

Hydroporus spp.

Family Elmidae

Dubiraphia spp.

Macronychus glabratus

Stenelmis spp.

Family Gyrinidae

Gyrinus spp.

Dineutes sp.

Table 2 (cont.). List of macroinvertebrates collected from Dragon Run watershed, Piankatank River drainage.

Order Coleoptera (cont.)

Family Haliplidae

Peltodytes sp.

Family Ptilodactylidae

Anchytarsus bicolor

Order Odonata

Family Aeshnidae

Boyeria vinosa

Nasiaschna pentacantha

Family Calopterygidae

Calopteryx spp.

Family Lestidae

Lestes sp.

Archlestes spp.

Family Libellulidae

Erythemis spp.

Pachydiplax longipennis

Sympetrum sp.

Family Coenagrionidae

Enallagma spp.

Ischnura sp.

Family Corduliidae

Epithea sp.

Helocordulia sp.

Macromia sp.

Family Gomphidae

Gomphus sp.

Dromogomphus sp.

Hagenius brevistylus

Order Hemiptera

Family Corixidae

Trichocorixa sp.

Order Bivalvia

Family Sphaeriidae

Pisidium sp.

Sphaerium sp.

Musculium sp.

Family Unionidae

Elliptio spp.

Utterbackia sp.

Table 2 (cont.). List of macroinvertebrates collected from Dragon Run watershed, Piankatank River drainage.

Order Bivalvia (cont.)

Family Unionidae (cont.)

Pyganodon sp.

Order Gastropoda

Family Ancyliidae

Ferrissia sp.

Family Physidae

Physa sp.

Physella sp.

Family Hydrobiidae

Amnicola spp.

Micromenetus spp.

Somatogyrus sp.

Family Planorbidae

Heliosoma spp.

Planorbula sp.

Gyraulus spp.

Family Lymnaeidae

Fossaria spp.

Pseudosuccinea columella

Family Viviparidae

Campeloma sp.

Order Decapoda

Family Cambaridae

Cambarus sp.

Orconectes spp.

Family Palaemonidae

Palaemonetes paludosus

Figure 1. Dragon Run Sampling Locations
Upper Sites

Dragon Run Sampling Locations - Upper Sites

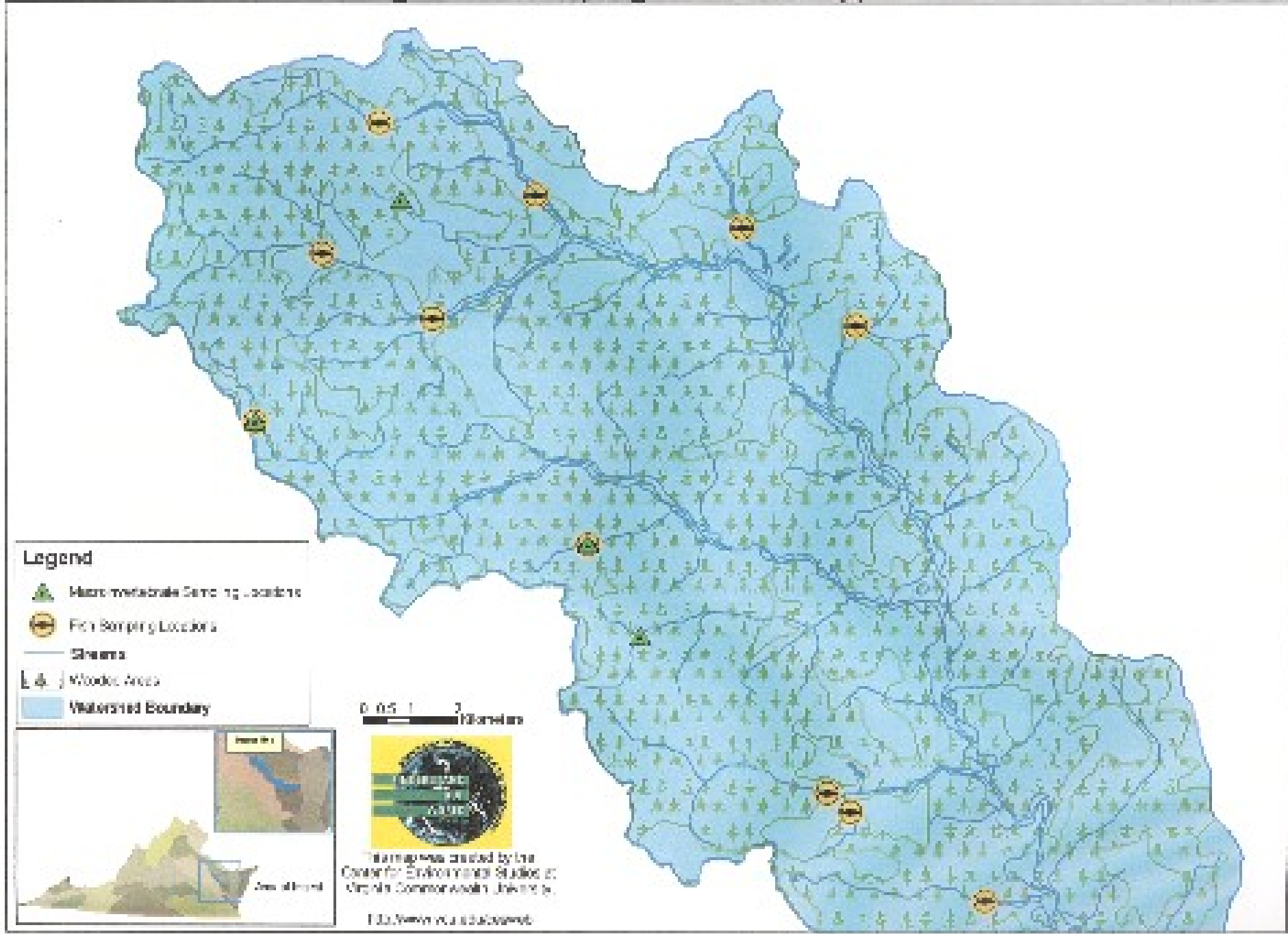


Figure 2. Dragon Run Sampling Locations
Middle Sites

Dragon Run Sampling Locations - Middle Sites

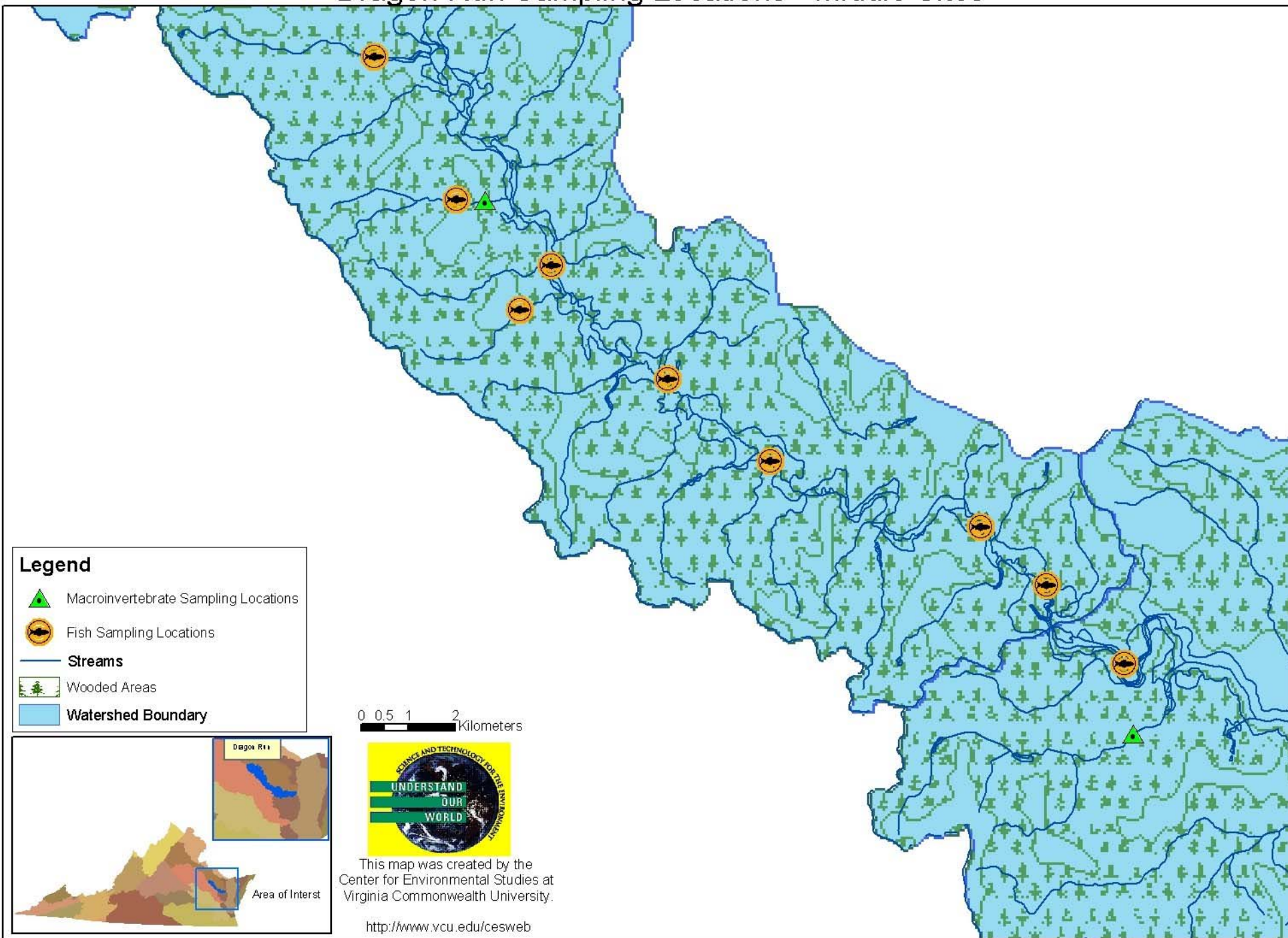
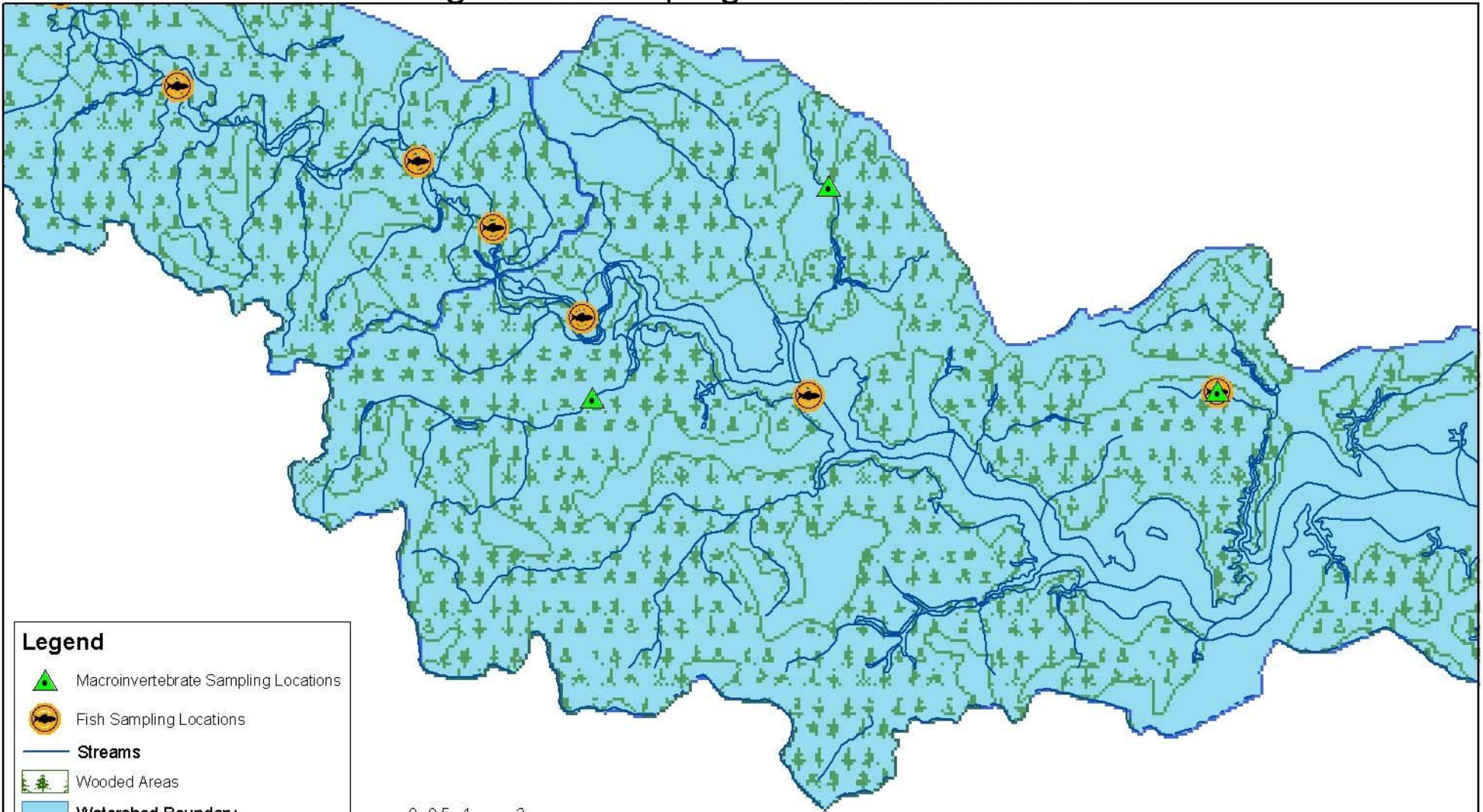


Figure 3. Dragon Run Sampling Locations
Lower Sites

Dragon Run Sampling Locations - Lower Sites



Legend

- Macroinvertebrate Sampling Locations
- Fish Sampling Locations
- Streams
- Wooded Areas
- Watershed Boundary



This map was created by the Center for Environmental Studies at Virginia Commonwealth University.

<http://www.vcu.edu/cesweb>

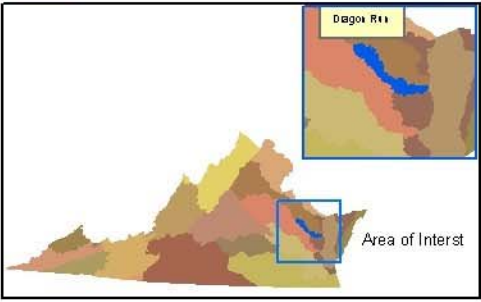
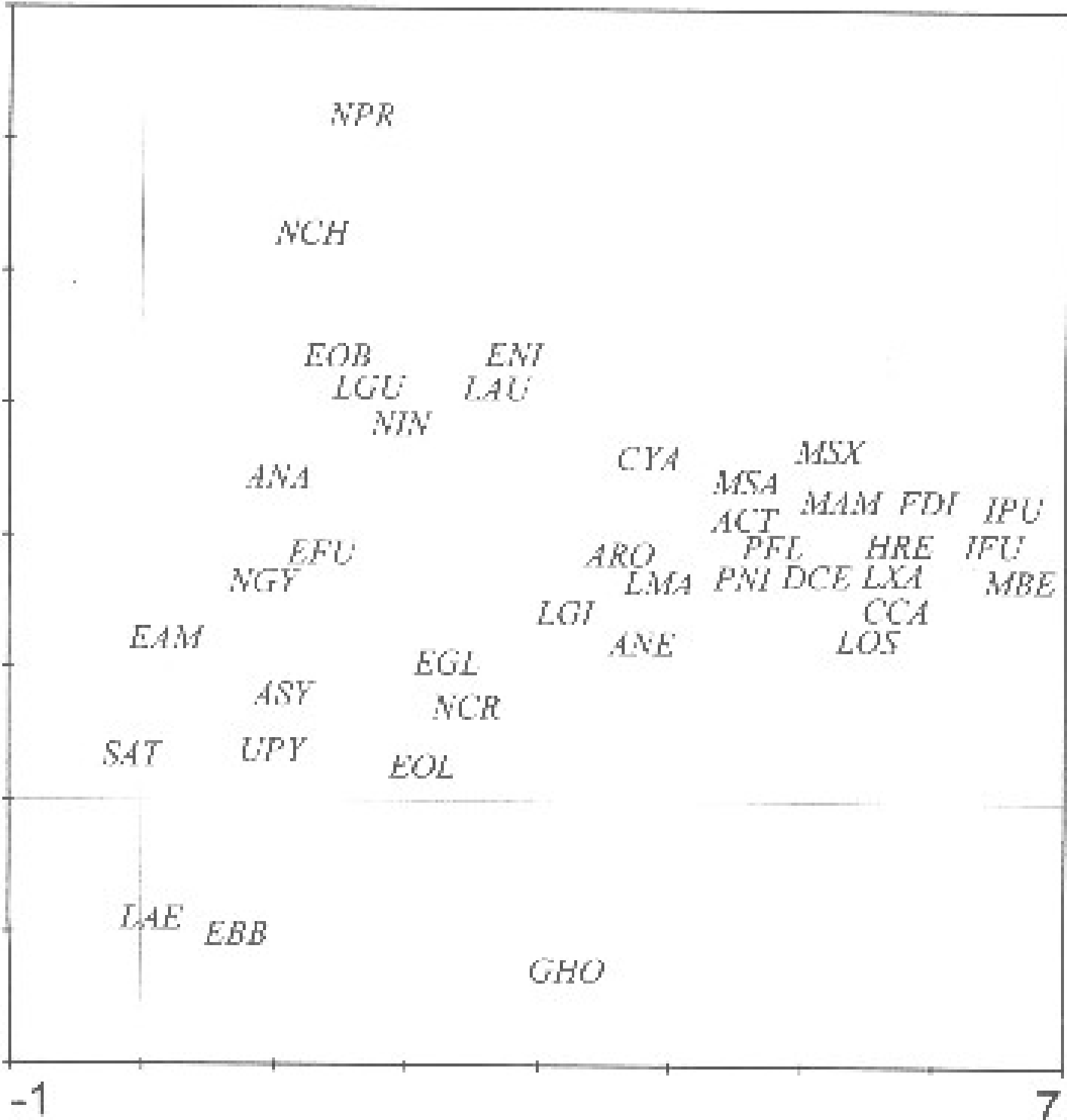


Figure 4. First and second axes from the Detrended Correspondence Analysis of species and site parameters from the Dragon Run system, Virginia. Species codes are VCU fish codes representing species by the first letter of the genus name followed by the first two letters of the species name. For example ARO = *Anguilla rostrata*.

6

-2



-1

7

Figure 5. First and second axes from the Detrended Correspondence Analysis of species and site parameters from the Dragon Run system, Virginia. Fish species are classified and groups enveloped. Specific distributions are identical to Figure 4 but codes have been hidden for clarity of groupings.

SPECIES

- Introduced Species
- ✕ CP endemics
- ✦ FW Rivers
- Estuarine spp
- diadromous
- Ubiquitous
- upland forms

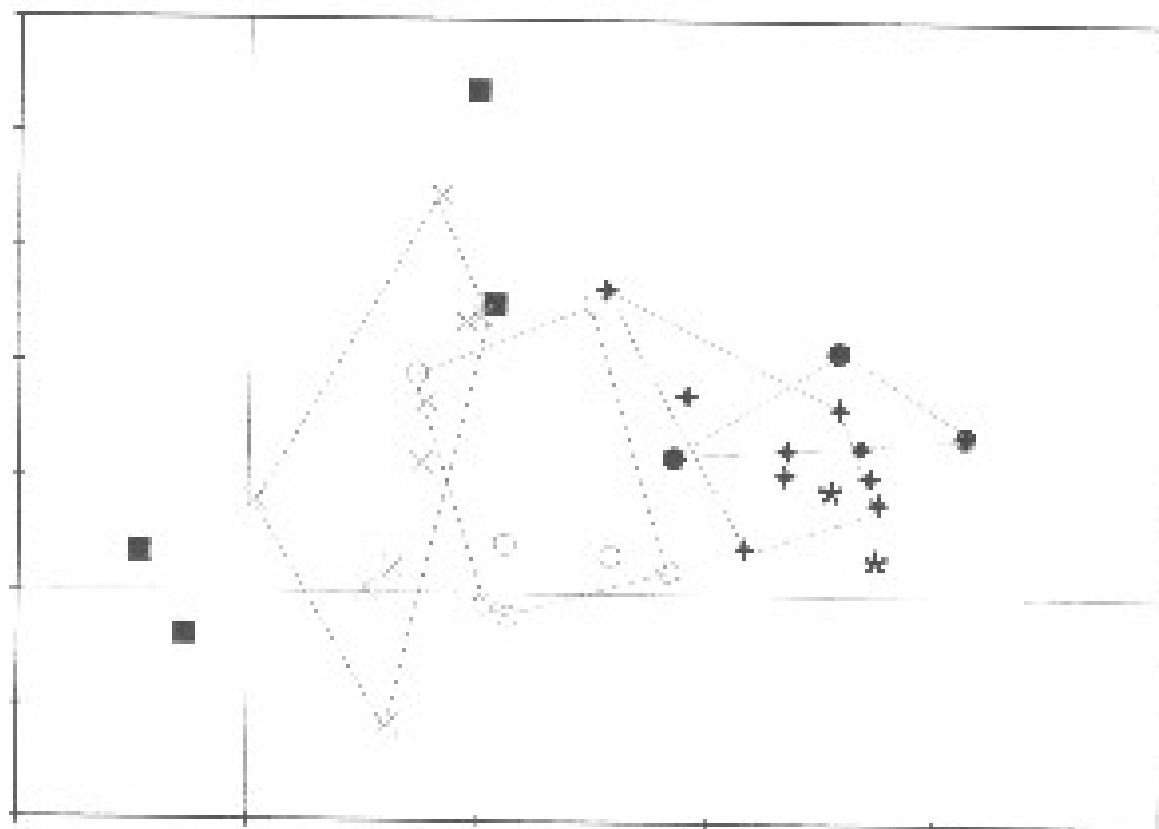
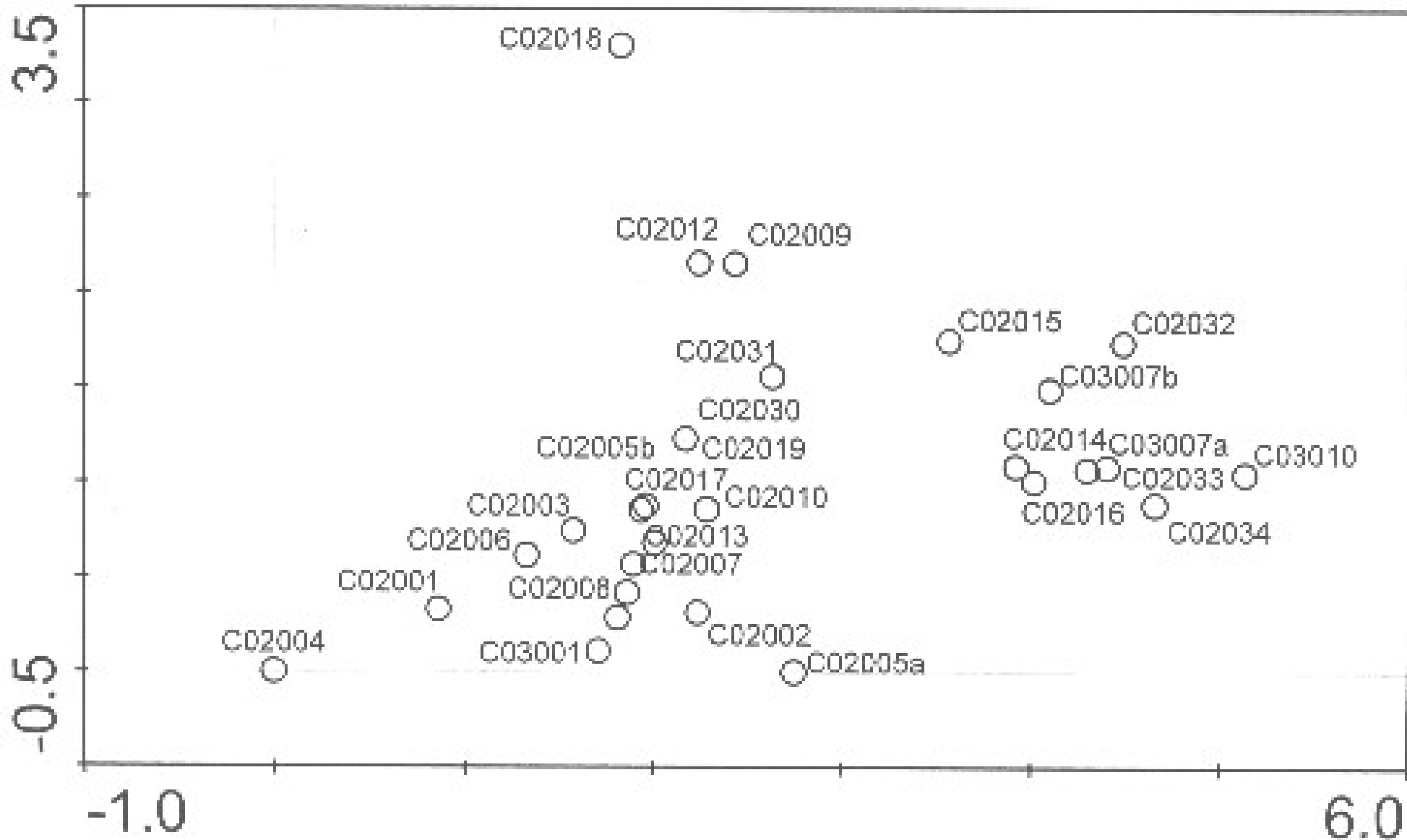


Figure 6. First and second axes from the Detrended Correspondence Analysis of species and site parameters from the Dragon Run system, Virginia. Site codes VCU site codes representing 8-digit HUC label (C02) and numbered site. In order to maintain clarity some sites in dense symbol areas are not printed. See data file or shapefile for more specific locality information.

SAMPLES



APPENDIX I

STANDARD OPERATING PROCEDURES

COLLECTION OF AQUATIC FAUNA

**Virginia Commonwealth University
Center for Environmental Studies
Aquatic Assessment Protocols**

Revision September 2002

Standard Operating Procedures Collection of Aquatic Fauna

The fundamental design of collection activities for these studies should optimize data for the assessment of biological integrity of streams and rivers and to better understand the relationships between the physical environment and its biological components. The survey(s) will document the distribution of various species, flag potential problem areas (and causation), and establish a basis for trend analyses (improvement/degradation).

Sample Site selection

Study sites may be selected through a statistically powerful stratified random design. The actual number of sites to be sampled will be based on the results of an initial power analysis, the amount of available resources and the quantity and quality of archival data. The selection of study sites will be made by first stratifying the potential sites (all freshwater sections) into stream order based on the Strahler method. For example, the Piankatank River is a 4th order river at its mouth and is fed by about 100 first order tributaries. Of these only about a dozen reach 2nd order and fewer develop into 3rd order sections. Because the large majority of the watershed (in number and length) is composed of 1st order streams, the large majority of sampling sites, in proportion, will also be of 1st order. All potential sites will be divided into 200-500m sections and tagged with a specific code using Arc View GIS software. The GIS software will then pick the chosen number of study sites per 14 digit HUC code, using the random site extension in ArcView 3.3. Additional sites will be chosen as backup sites in case of problems with the first selections (i.e. refusal of land owner, inefficient or hazardous sampling potential, high saline conditions, etc.).

Once computer has selected the study sites, visits will be made and landowners will be contacted for permission to access sites. Each 200-500 meter study site will be examined and a contiguous subset of 100 meters selected to reflect the availability of habitats in the immediate site. All sites will be georeferenced using Trimble® GPS units. Selection of sites to be sampled via boat electrofishing will be significantly longer than the 100 m section for streams.

General Methods

Each study site will be visited at least twice for a complete assessment. The first site visit will take place in the winter/spring and will involve obtaining landowner permission, determination of the 100 meter section to be sampled, macroinvertebrate sampling, and habitat. The second stage will involve collection of the fish community and will take place in the late spring and summer (likely into autumn). Observations for mussels, reptiles, and amphibians will be made during both site visits.

Collection Methods

MACROINVERTEBRATES

Macroinvertebrates will be collected using modified protocols of the EPA Rapid Bioassessment Design for single habitat collection (Barbour et al. 1997). D-frame dip nets will be used to sample macroinvertebrates from habitat groups found within the 100-meter study site. Examples of habitat groups are undercut banks w/hanging roots, hard substrate (gravel, etc.) riffles, leaf litter, and woody debris. Each habitat group will be sampled separately. Dip nets will be swept, jabbed and/or kicked in and through habitats in order to get a representative sample of macroinvertebrates. Nets will be emptied into 5 gallon buckets, sieved, then placed into a labeled bag and preserved with isopropanol laced with Rose Bengal. Samples will be picked back in the laboratory where the first 200 macroinvertebrates encountered will constitute the macroinvertebrate sample.

FISHES

Fishes will be sampled using electrofishing equipment in the form of backpacks, tote barge units or boats. Stream sampling will proceed in an upstream direction capturing all fishes possible from all habitats. Backpack and tote barge sampling will be performed throughout the entire 100 m section in a single pass. Boat electrofishing may include additional sampling depending on width and variability of stream section. Once sampling has been completed, the number of seconds sampled will be recorded. Fishes will then be identified, enumerated and examined for anomalies prior to being released. A voucher collection of all species collected will be maintained at the Virginia Commonwealth University Fish Museum.

MUSSELS

Freshwater clams and mussels will be collected at all study sites when shells are observed. Only those bivalves that are dead will be collected. Shells will be removed from substrates, placed into labeled plastic bags and sent to Brain Watson (VDGIF biologist) for positive identification. If only live specimens are observed on-site, detailed notes will be made as to the locality, shape and color of the observed bivalve and Mr. Watson notified with the information.

HABITAT

On-site habitat assessments will be documented by using the EPA's Rapid Habitat evaluation procedures. Team members will work together to reach a consensus on value, type, and quantity of habitat as grouped by the procedure. In addition it is recommended that all field teams take detailed notes of their collection efforts and the overall characterization of the study site. This is best accomplished by meticulous recording of field notes.

APPENDIX II

**Fish Collections
Dragon Run Watershed**

**Virginia Commonwealth University
Center for Environmental Studies**

Collection Report: Fish

Location code: C02001

Stream: Dragon

Stream Order: 1

Location: Exol Swamp above Rte 607

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EAM	1	0	REDFIN PICKEREL	ESOX	americanus
UPY	1	0	EASTERN MUDMINNOW	UMBRA	pygmaea
ASY	2	0	PIRATE PERCH	APHREDODERUS	sayanus

Location code: C02002

Stream: Dragon

Stream Order: 1

Location: Trib Exol Swamp Rte 617

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LGU	2	0	WARMOUTH	LEPOMIS	gulosus
NCH	1	0	IRONCOLOR SHINER	NOTROPIS	chalybaeus
EBB	5	0	Banded Sunfish	Enneacanthus	obesus
EOB	23	1	CREEK CHUBSUCKER	ERIMYZON	oblongus
EGL	29	0	Bluespotted Sunfish	Enneacanthus	gloriosus
NCR	23	2	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
ANE	3	1	BROWN BULLHEAD	AMEIURUS	nebulosus
LGI	12	2	PUMKINSEED	LEPOMIS	gibbosus
ASY	5	0	PIRATE PERCH	APHREDODERUS	sayanus
UPY	11	0	EASTERN MUDMINNOW	UMBRA	pygmaea
GHO	37	0	MOSQUITOFISH	Gambusia	holbrooki

Collection Report

Location code: C02003

Stream: Dragon

Stream Order: 2

Location: Timbers Branch Rts 610/614

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
ENI	1	0	CHAIN PICKEREL	ESOX	niger
NCR	9	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
ASY	5	1	PIRATE PERCH	APHREDODERUS	sayanus
EGL	7	0	Bluespotted Sunfish	Enneacanthus	gloriosus
EAM	6	0	REDFIN PICKEREL	ESOX	americanus
UPY	5	0	EASTERN MUDMINNOW	UMBRA	pygmaea
EOB	5	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
ANA	1	0	YELLOW BULLHEAD	AMEIURUS	natalis

Location code: C02004

Stream: Dragon

Stream Order: 1

Location: Trib Timbers Br Rte 610

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LAE	4	0	LEAST BROOK LAMPREY	Lampetra	aepyptera
SAT	4	0	CREEK CHUB	SEMOTILUS	atromaculatus
UPY	9	0	EASTERN MUDMINNOW	UMBRA	pygmaea

Location code: C02005

Stream: Dragon

Stream Order: 2

Location: Trib Dragon Run Rte 607

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LGI	126	0	PUMKINSEED	LEPOMIS	gibbosus
NCR	70	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
GHO	80	0	MOSQUITOFISH	Gambusia	holbrooki
EOB	14	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
ASY	8	0	PIRATE PERCH	APHREDODERUS	sayanus
ANA	1	0	YELLOW BULLHEAD	AMEIURUS	natalis
LGI	2	0	PUMKINSEED	LEPOMIS	gibbosus
ANE	5	0	BROWN BULLHEAD	AMEIURUS	nebulosus
EAM	1	0	REDFIN PICKEREL	ESOX	americanus
ARO	2	0	AMERICAN EEL	ANGUILLA	rostrata
EOB	1	0	CREEK CHUBSUCKER	ERIMYZON	oblongus

Collection Report

Location code: C02006

Stream: Dragon

Stream Order: 2

Location: Dragon Run @ Rte 612

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EGL	7	0	Bluespotted Sunfish	<i>Enneacanthus</i>	<i>gloriosus</i>
ASY	7	0	PIRATE PERCH	<i>APHREDODERUS</i>	<i>sayanus</i>
NCR	6	0	GOLDEN SHINER	<i>NOTEMIGONUS</i>	<i>crysoleucas</i>
EBB	1	0	Banded Sunfish	<i>Enneacanthus</i>	<i>obesus</i>
ANA	1	0	YELLOW BULLHEAD	<i>AMEIURUS</i>	<i>natalis</i>
EAM	25	0	REDFIN PICKEREL	<i>ESOX</i>	<i>americanus</i>
UPY	3	0	EASTERN MUDMINNOW	<i>UMBRA</i>	<i>pygmaea</i>
EOB	4	0	CREEK CHUBSUCKER	<i>ERIMYZON</i>	<i>oblongus</i>

Location code: C02007

Stream: Dragon

Stream Order: 1

Location: White Marsh Rte 684

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EAM	1	1	REDFIN PICKEREL	<i>ESOX</i>	<i>americanus</i>
ASY	24	0	PIRATE PERCH	<i>APHREDODERUS</i>	<i>sayanus</i>
LMA	6	1	BLUEGILL	<i>LEPOMIS</i>	<i>macrochirus</i>
GHO	1	0	MOSQUITOFISH	<i>Gambusia</i>	<i>holbrooki</i>
UPY	35	0	EASTERN MUDMINNOW	<i>UMBRA</i>	<i>pygmaea</i>
NGY	2	0	TADPOLE MADTOM	<i>NOTURUS</i>	<i>gyrinus</i>
EOB	2	0	CREEK CHUBSUCKER	<i>ERIMYZON</i>	<i>oblongus</i>
ARO	1	0	AMERICAN EEL	<i>ANGUILLA</i>	<i>rostrata</i>
NCR	12	2	GOLDEN SHINER	<i>NOTEMIGONUS</i>	<i>crysoleucas</i>

Location code: C02008

Stream: Dragon

Stream Order: 2

Location: Yorkers Swamp Rte 719

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LMA	6	2	BLUEGILL	<i>LEPOMIS</i>	<i>macrochirus</i>
ASY	12	0	PIRATE PERCH	<i>APHREDODERUS</i>	<i>sayanus</i>
UPY	10	0	EASTERN MUDMINNOW	<i>UMBRA</i>	<i>pygmaea</i>
EOL	13	0	TESSELLATED DARTER	<i>Etheostoma</i>	<i>olmstedii</i>
NGY	1	0	TADPOLE MADTOM	<i>NOTURUS</i>	<i>gyrinus</i>
LAE	1	0	LEAST BROOK LAMPREY	<i>Lampetra</i>	<i>aepyptera</i>

Collection Report

Location code: C02009

Stream: Dragon

Stream Order: 1

Location: Trib Dragon Run Rte 610

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
ARO	1	0	AMERICAN EEL	ANGUILLA	rostrata
LAU	5	0	REDBREAST SUNFISH	LEPOMIS	auritus
EOB	7	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
NCH	18	0	IRONCOLOR SHINER	NOTROPIS	chalybaeus
LGI	2	0	PUMKINSEED	LEPOMIS	gibbosus
ENI	1	0	CHAIN PICKEREL	ESOX	niger
ANE	1	0	BROWN BULLHEAD	AMEIURUS	nebulosus
NCR	1	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
LGU	3	0	WARMOUTH	LEPOMIS	gulosus

Location code: C02010

Stream: Dragon

Stream Order: 2

Location: Dragon Run Rte 607

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LGU	0	0	WARMOUTH	LEPOMIS	gulosus
NCH	0	0	IRONCOLOR SHINER	NOTROPIS	chalybaeus
ENI	0	0	CHAIN PICKEREL	ESOX	niger
EOB	0	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
EGL	0	0	Bluespotted Sunfish	Enneacanthus	gloriosus
LGI	0	0	PUMKINSEED	LEPOMIS	gibbosus
GHO	0	0	MOSQUITOFISH	Gambusia	holbrooki
UPY	0	0	EASTERN MUDMINNOW	UMBRA	pygmaea
ASY	0	0	PIRATE PERCH	APHREDODERUS	sayanus
ANA	0	0	YELLOW BULLHEAD	AMEIURUS	natalis
LMA	0	0	BLUEGILL	LEPOMIS	macrochirus
NCR	0	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
ANE	0	0	BROWN BULLHEAD	AMEIURUS	nebulosus

Collection Report

Location code: C02012

Stream: Dragon

Stream Order: 0

Location: Dragon Run @Co rte 603

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
NGY	1	0	TADPOLE MADTOM	NOTURUS	<i>gyrinus</i>
ENI	5	0	CHAIN PICKEREL	ESOX	<i>niger</i>
LGU	5	0	WARMOUTH	LEPOMIS	<i>gulosus</i>
EOB	8	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>
ANA	1	0	YELLOW BULLHEAD	AMEIURUS	<i>natalis</i>
NCH	5	0	IRONCOLOR SHINER	NOTROPIS	<i>chalybaeus</i>
LGI	5	0	PUMKINSEED	LEPOMIS	<i>gibbosus</i>

Location code: C02013

Stream: Dragon

Stream Order:

Location: UNT Dragon Swamp S of Rte 603

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EOL	22	0	TESSELLATED DARTER	<i>Etheostoma</i>	<i>olmstedii</i>
LGI	4	0	PUMKINSEED	LEPOMIS	<i>gibbosus</i>
LAE	6	0	LEAST BROOK LAMPREY	<i>Lampetra</i>	<i>aepyptera</i>
ARO	12	0	AMERICAN EEL	ANGUILLA	<i>rostrata</i>
NCH	3	0	IRONCOLOR SHINER	NOTROPIS	<i>chalybaeus</i>
EGL	7	0	Bluespotted Sunfish	<i>Enneacanthus</i>	<i>gloriosus</i>
ANE	1	0	BROWN BULLHEAD	AMEIURUS	<i>nebulosus</i>
EOB	8	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>
ASY	16	0	PIRATE PERCH	APHREDODERUS	<i>sayanus</i>
UPY	42	0	EASTERN MUDMINNOW	UMBRA	<i>pygmaea</i>
NCR	16	0	GOLDEN SHINER	NOTEMIGONUS	<i>crysoleucas</i>
NGY	1	0	TADPOLE MADTOM	NOTURUS	<i>gyrinus</i>

Collection Report

Location code: C02014

Stream: Dragon

Stream Order:

Location: Dragon Run between A4-A5

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EOL	6	0	TESSELLATED DARTER	<i>Etheostoma</i>	<i>olmstedii</i>
CYA	14	0	SATINFIN SHINER	<i>CYPRINELLA</i>	<i>analostana</i>
MSA	10	0	LARGEMOUTH BASS	<i>MICROPTERUS</i>	<i>salmoides</i>
LMA	7	0	BLUEGILL	<i>LEPOMIS</i>	<i>macrochirus</i>
PFL	2	0	YELLOW PERCH	<i>PERCA</i>	<i>flavescens</i>
ARO	20	0	AMERICAN EEL	<i>ANGUILLA</i>	<i>rostrata</i>
NAM	1	0	COMELY SHINER	<i>NOTROPIS</i>	<i>amoenus</i>
LAU	2	0	REDBREAST SUNFISH	<i>LEPOMIS</i>	<i>auritus</i>
ACT	20	0	WHITE CATFISH	<i>AMEIURUS</i>	<i>catus</i>
MPU	1	0	SPOTTED BASS	<i>MICROPTERUS</i>	<i>punctulatus</i>
ANE	12	0	BROWN BULLHEAD	<i>AMEIURUS</i>	<i>nebulosus</i>
MAM	2	0	WHITE PERCH	<i>MORONE</i>	<i>americana</i>

Location code: C02015

Stream: Dragon

Stream Order: 0

Location: Dragon Run below Rte 17

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
EOB	1	0	CREEK CHUBSUCKER	<i>ERIMYZON</i>	<i>oblongus</i>
LGI	1	0	PUMKINSEED	<i>LEPOMIS</i>	<i>gibbosus</i>
LAU	1	0	REDBREAST SUNFISH	<i>LEPOMIS</i>	<i>auritus</i>
EGL	1	0	Bluespotted Sunfish	<i>Enneacanthus</i>	<i>gloriosus</i>
MSA	1	0	LARGEMOUTH BASS	<i>MICROPTERUS</i>	<i>salmoides</i>
NPR	1	0	SWALLOWTAIL SHINER	<i>NOTROPIS</i>	<i>procne</i>
MAM	1	0	WHITE PERCH	<i>MORONE</i>	<i>americana</i>
MSX	1	0	STRIPED BASS	<i>MORONE</i>	<i>saxatilis</i>
ARO	1	0	AMERICAN EEL	<i>ANGUILLA</i>	<i>rostrata</i>
LMI	1	0	REDEAR SUNFISH	<i>LEPOMIS</i>	<i>microlophus</i>
ENI	1	0	CHAIN PICKEREL	<i>ESOX</i>	<i>niger</i>
LMA	1	0	BLUEGILL	<i>LEPOMIS</i>	<i>macrochirus</i>

Collection Report

Location code: C02016

Stream: Dragon

Stream Order:

Location: Lower Dragon Run

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LMA	6	0	BLUEGILL	LEPOMIS	macrochirus
MSA	17	0	LARGEMOUTH BASS	MICROPTERUS	salmoides
DCE	5	0	GIZZARD SHAD	DOROSOMA	cepedianum
LOS	5	0	LONGNOSE GAR	LEPISOSTEUS	osseus
LGI	13	0	PUMKINSEED	LEPOMIS	gibbosus
NCR	7	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
MAM	1	0	WHITE PERCH	MORONE	americana
LGU	1	0	WARMOUTH	LEPOMIS	gulosus
PNI	3	0	BLACK CRAPPIE	POMOXIS	nigromaculatus
ARO	3	0	AMERICAN EEL	ANGUILLA	rostrata
PFL	4	0	YELLOW PERCH	PERCA	flavescens
LMI	6	0	REDEAR SUNFISH	LEPOMIS	microlophus
EGL	3	0	Bluespotted Sunfish	Enneacanthus	gloriosus

Location code: C02017

Stream: Dragon

Stream Order: 0

Location: UNT of Dragon Run /Rte 612

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
ANA	1	0	YELLOW BULLHEAD	AMEIURUS	natalis
LGU	1	0	WARMOUTH	LEPOMIS	gulosus
NCR	5	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
EOB	2	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
ARO	7	0	AMERICAN EEL	ANGUILLA	rostrata
EAM	6	0	REDFIN PICKEREL	ESOX	americanus
ASY	2	0	PIRATE PERCH	APHREDODERUS	sayanus
LGI	6	0	PUMKINSEED	LEPOMIS	gibbosus
EGL	3	0	Bluespotted Sunfish	Enneacanthus	gloriosus
ANE	1	0	BROWN BULLHEAD	AMEIURUS	nebulosus
UPY	14	0	EASTERN MUDMINNOW	UMBRA	pygmaea

Collection Report

Location code: C02018

Stream: Dragon

Stream Order:

Location: Dragon Run downstream of rte 603

Drainage: Piankatank

Fish Code	Quantity clean	Quantity anomaly	Common name	Genus	Species
NPR	10	0	SWALLOWTAIL SHINER	NOTROPIS	<i>procne</i>
EOB	15	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>
NCH	25	0	IRONCOLOR SHINER	NOTROPIS	<i>chalybaeus</i>

Location code: C02019

Stream: Dragon

Stream Order:

Location: UNT Dragon Swamp above Rte 610

Drainage: Piankatank

Fish Code	Quantity clean	Quantity anomaly	Common name	Genus	Species
EOB	0	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>
UPY	0	0	EASTERN MUDMINNOW	UMBRA	<i>pygmaea</i>
EOL	0	0	TESSELLATED DARTER	<i>Etheostoma</i>	<i>olmstedii</i>
SAT	0	0	CREEK CHUB	SEMOTILUS	<i>atromaculatus</i>
EGL	0	0	Bluespotted Sunfish	<i>Enneacanthus</i>	<i>gloriosus</i>
LGU	0	0	WARMOUTH	LEPOMIS	<i>gulosus</i>
LAU	0	0	REDBREAST SUNFISH	LEPOMIS	<i>auritus</i>
ARO	0	0	AMERICAN EEL	ANGUILLA	<i>rostrata</i>
EFU	0	0	SWAMP DARTER	<i>Etheostoma</i>	<i>fusiforme</i>
NGY	0	0	TADPOLE MADTOM	NOTURUS	<i>gyrinus</i>
NCR	0	0	GOLDEN SHINER	NOTEMIGONUS	<i>crysoleucas</i>
ASY	0	0	PIRATE PERCH	APHREDODERUS	<i>sayanus</i>
ANA	0	0	YELLOW BULLHEAD	AMEIURUS	<i>natalis</i>
ANE	0	0	BROWN BULLHEAD	AMEIURUS	<i>nebulosus</i>
EAM	0	0	REDFIN PICKEREL	ESOX	<i>americanus</i>
LGI	0	0	PUMKINSEED	LEPOMIS	<i>gibbosus</i>

Collection Report

Location code: C02030

Stream: Dragon

Stream Order:

*Location: Dragon Swamp between Rts
602-603*

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LGU	0	0	WARMOUTH	LEPOMIS	gulosus
UPY	0	0	EASTERN MUDMINNOW	UMBRA	pygmaea
ARO	0	0	AMERICAN EEL	ANGUILLA	rostrata
LMA	0	0	BLUEGILL	LEPOMIS	macrochirus
ANE	0	0	BROWN BULLHEAD	AMEIURUS	nebulosus
SAT	0	0	CREEK CHUB	SEMOTILUS	atromaculatus
LAU	0	0	REDBREAST SUNFISH	LEPOMIS	auritus
ENI	0	0	CHAIN PICKEREL	ESOX	niger
ASY	0	0	PIRATE PERCH	APHREDODERUS	sayanus
EAM	0	0	REDFIN PICKEREL	ESOX	americanus
EGL	0	0	Bluespotted Sunfish	Enneacanthus	gloriosus
PFL	0	0	YELLOW PERCH	PERCA	flavescens
NCH	0	0	IRONCOLOR SHINER	NOTROPIS	chalybaeus
ANA	0	0	YELLOW BULLHEAD	AMEIURUS	natalis
NIN	0	0	MARGINATED MADTOM	NOTURUS	insignis
EFU	0	0	SWAMP DARTER	Etheostoma	fusiforme
LGI	0	0	PUMKINSEED	LEPOMIS	gibbosus
PNO	0	0	STRIPEBACK DARTER	PERCINA	notogramma

Collection Report

Location code: C02031

Stream: Dragon

Stream Order:

Location: Dragon Swamp above Rte 17

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
ASY	0	0	PIRATE PERCH	APHREDODERUS	sayanus
EOB	0	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
ARO	0	0	AMERICAN EEL	ANGUILLA	rostrata
EOL	0	0	TESSELLATED DARTER	Etheostoma	olmstedii
CYA	0	0	SATINFIN SHINER	CYPRINELLA	analostana
ENI	0	0	CHAIN PICKEREL	ESOX	niger
NIN	0	0	MARGINATED MADTOM	NOTURUS	insignis
ANA	0	0	YELLOW BULLHEAD	AMEIURUS	natalis
LAU	0	0	REDBREAST SUNFISH	LEPOMIS	auritus
NCH	0	0	IRONCOLOR SHINER	NOTROPIS	chalybaeus
NCR	0	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
LMA	0	0	BLUEGILL	LEPOMIS	macrochirus
NGY	0	0	TADPOLE MADTOM	NOTURUS	gyrinus
MSA	0	0	LARGEMOUTH BASS	MICROPTERUS	salmoides
NPR	0	0	SWALLOWTAIL SHINER	NOTROPIS	procne
LGI	0	0	PUMKINSEED	LEPOMIS	gibbosus
LGU	0	0	WARMOUTH	LEPOMIS	gulosus
PPE	0	0	SHEILD DARTER	PERCINA	peltata
UPY	0	0	EASTERN MUDMINNOW	UMBRA	pygmaea
ANE	0	0	BROWN BULLHEAD	AMEIURUS	nebulosus

Location code: C02032

Stream: Dragon

Stream Order:

Location: Dragon Run about 3 km down from rte 17

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
LMA	1	0	BLUEGILL	LEPOMIS	macrochirus
ENI	1	0	CHAIN PICKEREL	ESOX	niger
MSA	2	0	LARGEMOUTH BASS	MICROPTERUS	salmoides
DCE	1	0	GIZZARD SHAD	DOROSOMA	cepedianum
PFL	1	0	YELLOW PERCH	PERCA	flavescens
MAM	7	0	WHITE PERCH	MORONE	americana
MSX	7	0	STRIPED BASS	MORONE	saxatilis
ARO	1	0	AMERICAN EEL	ANGUILLA	rostrata
LAU	2	0	REDBREAST SUNFISH	LEPOMIS	auritus
ACT	1	0	WHITE CATFISH	AMEIURUS	catus

Collection Report

Location code: C02033

Stream: Dragon

Stream Order:

Location: Lower Dragon Run

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
PFL	10	0	YELLOW PERCH	PERCA	flavescens
ARO	5	0	AMERICAN EEL	ANGUILLA	rostrata
EGL	2	0	Bluespotted Sunfish	Enneacanthus	gloriosus
LMI	2	0	REDEAR SUNFISH	LEPOMIS	microlophus
LOS	7	0	LONGNOSE GAR	LEPISOSTEUS	osseus
LXA	3	0	SPOT	LEIOSTOMUS	xanthurus
CCA	5	0	COMMON CARP	CYPRINUS	carpio
ANE	11	0	BROWN BULLHEAD	AMEIURUS	nebulosus
MPU	1	0	SPOTTED BASS	MICROPTERUS	punctulatus
NCR	1	0	GOLDEN SHINER	NOTEMIGONUS	crysoleucas
MSA	7	0	LARGEMOUTH BASS	MICROPTERUS	salmoides
MSX	2	0	STRIPED BASS	MORONE	saxatilis
MAM	19	3	WHITE PERCH	MORONE	americana
LMA	6	0	BLUEGILL	LEPOMIS	macrochirus
LGI	7	0	PUMKINSEED	LEPOMIS	gibbosus
EOB	1	0	CREEK CHUBSUCKER	ERIMYZON	oblongus
ACT	2	0	WHITE CATFISH	AMEIURUS	catus
AMI	12	0	BAY ANCHOVY	ANCHOA	mitchilli

Collection Report

Location code: C02034

Stream: Dragon

Stream Order:

Location: Dragon Run above power lines

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
FDI	56	0	BANDED KILLIFISH	<i>Fundulus</i>	<i>diaphanus</i>
MSA	3	0	LARGEMOUTH BASS	<i>MICROPTERUS</i>	<i>salmoides</i>
ARO	6	0	AMERICAN EEL	<i>ANGUILLA</i>	<i>rostrata</i>
PFL	1	0	YELLOW PERCH	<i>PERCA</i>	<i>flavescens</i>
MAM	1	0	WHITE PERCH	<i>MORONE</i>	<i>americana</i>
LGI	1	0	PUMKINSEED	<i>LEPOMIS</i>	<i>gibbosus</i>
GHO	1	0	MOSQUITOFISH	<i>Gambusia</i>	<i>holbrooki</i>
LMA	2	0	BLUEGILL	<i>LEPOMIS</i>	<i>macrochirus</i>
LMI	7	0	REDEAR SUNFISH	<i>LEPOMIS</i>	<i>microlophus</i>
HRE	72	0	EASTERN SILVERY MINNOW	<i>Hybognathus</i>	<i>regius</i>

Location code: C03001

Stream: Wilton Cr

Stream Order: 2

Location: Trib of Wilton Cr (Rte 630/ Rte 33)

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
GHO	69	0	MOSQUITOFISH	<i>Gambusia</i>	<i>holbrooki</i>
EOB	18	0	CREEK CHUBSUCKER	<i>ERIMYZON</i>	<i>oblongus</i>
UPY	61	0	EASTERN MUDMINNOW	<i>UMBRA</i>	<i>pygmaea</i>
ARO	7	0	AMERICAN EEL	<i>ANGUILLA</i>	<i>rostrata</i>
NCR	1	0	GOLDEN SHINER	<i>NOTEMIGONUS</i>	<i>crysoleucas</i>
LAE	15	0	LEAST BROOK LAMPREY	<i>Lampetra</i>	<i>aepyptera</i>
SAT	5	0	CREEK CHUB	<i>SEMOTILUS</i>	<i>atromaculatus</i>
EOL	10	0	TESSELLATED DARTER	<i>Etheostoma</i>	<i>olmstedii</i>
ASY	14	0	PIRATE PERCH	<i>APHREDODERUS</i>	<i>sayanus</i>
LGI	14	0	PUMKINSEED	<i>LEPOMIS</i>	<i>gibbosus</i>

Collection Report

Location code: C03007

Stream: Piankatank

Stream Order:

Location: Piankatank R beginning

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
NCR	5	0	GOLDEN SHINER	NOTEMIGONUS	<i>crysoleucas</i>
EOB	1	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>
IFU	1	0	BLUE CATFISH	<i>Ictalurus</i>	<i>furcatus</i>
ACT	3	0	WHITE CATFISH	AMEIURUS	<i>catus</i>
PFL	1	0	YELLOW PERCH	PERCA	<i>flavescens</i>
CCA	2	0	COMMON CARP	CYPRINUS	<i>carpio</i>
ARO	2	0	AMERICAN EEL	ANGUILLA	<i>rostrata</i>
PNI	1	0	BLACK CRAPPIE	POMOXIS	<i>nigromaculatus</i>
HRE	9	0	EASTERN SILVERY MINNOW	<i>Hybognathus</i>	<i>regius</i>
ARO	2	0	AMERICAN EEL	ANGUILLA	<i>rostrata</i>
PFL	14	0	YELLOW PERCH	PERCA	<i>flavescens</i>
ANE	13	0	BROWN BULLHEAD	AMEIURUS	<i>nebulosus</i>
LGI	1	0	PUMKINSEED	LEPOMIS	<i>gibbosus</i>
MAM	1	0	WHITE PERCH	MORONE	<i>americana</i>
MSX	1	0	STRIPED BASS	MORONE	<i>saxatilis</i>
ENI	1	0	CHAIN PICKEREL	ESOX	<i>niger</i>
MAM	11	0	WHITE PERCH	MORONE	<i>americana</i>
MSA	11	0	LARGEMOUTH BASS	MICROPTERUS	<i>salmoides</i>
LOS	2	0	LONGNOSE GAR	LEPISOSTEUS	<i>osseus</i>
EGL	2	0	Bluespotted Sunfish	<i>Enneacanthus</i>	<i>gloriosus</i>
DCE	20	0	GIZZARD SHAD	DOROSOMA	<i>cepedianum</i>
LGI	16	0	PUMKINSEED	LEPOMIS	<i>gibbosus</i>
ENI	1	0	CHAIN PICKEREL	ESOX	<i>niger</i>
LMI	3	0	REDEAR SUNFISH	LEPOMIS	<i>microlophus</i>
LMI	1	0	REDEAR SUNFISH	LEPOMIS	<i>microlophus</i>
MSA	12	0	LARGEMOUTH BASS	MICROPTERUS	<i>salmoides</i>
MSX	3	0	STRIPED BASS	MORONE	<i>saxatilis</i>
LMA	3	0	BLUEGILL	LEPOMIS	<i>macrochirus</i>
LMA	10	0	BLUEGILL	LEPOMIS	<i>macrochirus</i>
EOB	1	0	CREEK CHUBSUCKER	ERIMYZON	<i>oblongus</i>

Collection Report

Location code: C03010

Stream: Piankatank

Stream Order:

Location: Piankatank R below comm. Boat Ramp

Drainage: Piankatank

<i>Fish Code</i>	<i>Quantity clean</i>	<i>Quantity anomaly</i>	<i>Common name</i>	<i>Genus</i>	<i>Species</i>
ARO	0	0	AMERICAN EEL	ANGUILLA	rostrata
LXA	0	0	SPOT	LEIOSTOMUS	xanthurus
LOS	0	0	LONGNOSE GAR	LEPISOSTEUS	osseus
GHO	0	0	MOSQUITOFISH	Gambusia	holbrooki
MAM	0	0	WHITE PERCH	MORONE	americana
MBE	0	0	INLAND SILVERSIDE	MENIDIA	beryllina
ASA	0	0	AMERICAN SHAD	ALOSA	sapidissima
HRE	0	0	EASTERN SILVERY MINNOW	Hybognathus	regius
IFU	0	0	BLUE CATFISH	Ictalurus	furcatus
IPU	0	0	CHANNEL CATFISH	Ictalurus	punctatus
DCE	0	0	GIZZARD SHAD	DOROSOMA	cepedianum
CCA	0	0	COMMON CARP	CYPRINUS	carpio
MSX	0	0	STRIPED BASS	MORONE	saxatilis
ARO	0	0	AMERICAN EEL	ANGUILLA	rostrata

APPENDIX III

**Macroinvertebrate Collections
Dragon Run Watershed**

**Virginia Commonwealth University
Center for Environmental Studies**

Collection Report: Macroinvertebrates

Location Code: C02001

Stream Name: Dragon Run

Stream Order: 1

Location: Exol Swamp DR-1

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
ECCA	Caenidae	<i>Caenis</i>	<i>sp.</i>	1
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	1
MSSI	Sialidae	<i>Sialis</i>	<i>sp.</i>	1
OLPA	Libellulidae	<i>Pachydiplax</i>	<i>longipenis</i>	1
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	1
GPGY	Planorbidae	<i>Gyraulus</i>	<i>spp.</i>	1
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	1
TPPT	Phryganeidae	<i>Ptilostomis</i>	<i>sp.</i>	1
OCEP	Corduliidae	<i>Epitheca</i>	<i>sp.</i>	2
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	3
CDHY	Dytiscidae	<i>Hydroporus</i>	<i>spp.</i>	5
OCIS	Coenagrionidae	<i>Ischnura</i>	<i>sp.</i>	7
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	9
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	36
DCXX	Chironomidae			131
DCCL	Culicidae	<i>Culex</i>	<i>sp.</i>	1

Collection Report

Location Code: C02002

Stream Name: Dragon Run

Stream Order: 1

Location: Exol Swamp DR-14

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DTTI	Tipulidae	<i>Tipula</i>	<i>abdominalis</i>	2
ELLE	Leptophlebiidae	<i>Leptophlebia</i>	sp.	3
AOXX	Oligochaetae			3
AGGA	Gammaridae	<i>Gammarus</i>	sp.	15
IACA	Asellidae	<i>Caecidotea</i>	sp.	18
BSPI	Sphaeriidae	<i>Pisidium</i>	sp.	32
DCXX	Chironomidae			50
GPGY	Planorbidae	<i>Gyraulus</i>	spp.	2
ELPA	Leptophlebiidae	<i>Paraleptophlebia</i>	sp.	2
EEEEP	Ephemerellidae	<i>Ephemerella</i>	spp.	1
DCAX	Cambaridae			1
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	1
ECCA	Caenidae	<i>Caenis</i>	sp.	1
GAFE	Ancylidae	<i>Ferrissia</i>	sp.	1
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	spp.	81

Location Code: C02003

Stream Name: Dragon Run Timber Br.

Stream Order: 2

Location: Timber Br DR-11

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
BSPI	Sphaeriidae	<i>Pisidium</i>	sp.	3
OCEN	Coenagrionidae	<i>Enallagma</i>	spp.	1
DCPA	Ceratopogonidae	<i>Palpomyia</i>	spp.	1
GLPS	Lymnaeidae	<i>Pseudosuccinea</i>	<i>columella</i>	1
AOXX	Oligochaetae			3
DCCU	Ceratopogonidae	<i>Culicoides</i>	spp.	3
DCXX	Chironomidae			16
GHSO	Hydrobiidae	<i>Somatogyrus</i>	spp.	19
IACA	Asellidae	<i>Caecidotea</i>	sp.	52
AGGA	Gammaridae	<i>Gammarus</i>	sp.	93
DCAX	Cambaridae			1

Collection Report

Location Code: C02004

Stream Name: Dragon Run

Stream Order: 1

Location: UNT Timber Br; DR-11b

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DTTI	Tipulidae	<i>Tipula</i>	<i>abdominalis</i>	2
DCAX	Cambaridae			1
MCNI	Corydalidae	<i>Nigronia</i>	<i>serricornis</i>	4
DCPA	Ceratopogonidae	<i>Palpomyia</i>	<i>spp.</i>	1
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	1
DTPI	Tipulidae	<i>Pilaria</i>	<i>spp.</i>	1
TPLY	Psychomyiidae	<i>Lype</i>	<i>diversa</i>	2
PCAL	Capniidae	<i>Allocapnia</i>	<i>sp.</i>	4
TPPO	Polycentropodidae	<i>Polycentropus</i>	<i>spp.</i>	2
MSSI	Sialidae	<i>Sialis</i>	<i>sp.</i>	1
DCXX	Chironomidae			93
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	27
EEEE	Ephemerellidae	<i>Eurylophella</i>	<i>temporalis</i>	26
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	23
ELPA	Leptophlebiidae	<i>Paraleptophlebia</i>	<i>sp.</i>	6
TLPY	Limnephilidae	<i>Pycnopsyche</i>	<i>spp.</i>	2
TMMO	Molannidae	<i>Molanna</i>	<i>blenda</i>	2
DCPR	Ceratopogonidae	<i>Probezzia</i>	<i>sp.</i>	2
OABO	Aeshnidae	<i>Boyeria</i>	<i>vinosa</i>	2
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	2
DSXX	Simuliidae			19

Collection Report

Location Code: C02006

Stream Name: Dragon Run

Stream Order: 2

Location: Dragon Run DR-13

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
GHSO	Hydrobiidae	<i>Somatogyrus</i>	<i>spp.</i>	5
OCEM	Coenagrionidae	<i>Enallagma</i>	<i>spp.</i>	4
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	73
DCXX	Chironomidae			26
BSSP	Sphaeriidae	<i>Sphaerium</i>	<i>sp.</i>	5
HCTR	Corixidae	<i>Trichocorixa</i>	<i>sp.</i>	1
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	1
AHXX	Hirudinea			1
OLPA	Libellulidae	<i>Pachydiplax</i>	<i>longipenis</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	91
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	2

Location Code: C02007

Stream Name: Dragon Run

Stream Order: 1

Location: White Marsh Site 15

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	19
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	22
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	8
CHPE	Haliplidae	<i>Peltodytes</i>	<i>sp.</i>	1
DSXX	Simuliidae			1
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	29
DCXX	Chironomidae			38
AOXX	Oligochaetae			5

Location Code: C02008

Stream Name: Dragon Run

Stream Order: 2

Location: Yorkers Swamp DR-17

Drainage: Piankatank

Sample Date:

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	4
DCXX	Chironomidae			36
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	13
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	1
AHXX	Hirudinea	0		

Collection Report

Location Code: C02011

Stream Name: Holmes Swamp

Stream Order:

Location: Holmes Swamp Rte 616

Drainage: Piankatank

Sample Date: 2/3/2003

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
AGGA	Gammaridae	<i>Gammarus</i>	sp.	9
TLIR	Limnephilidae	<i>Ironoquia</i>	spp.	1
HCTR	Corixidae	<i>Trichocorixa</i>	sp.	1
PNNE	Nemouridae	<i>Nemoura</i>	spp.	3
DSXX	Simuliidae			22
AOXX	Oligochaetae			4
DCXX	Chironomidae			13
IACA	Asellidae	<i>Caecidotea</i>	sp.	3
DCCU	Ceratopogonidae	<i>Culicoides</i>	spp.	1
BSPI	Sphaeriidae	<i>Pisidium</i>	sp.	4

Location Code: C02013

Stream Name: Un-named

Stream Order:

Location: Un-named Tributary
Route 610 South of 603

Drainage: Piankatank

Sample Date: 2/3/2003

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DCXX	Chironomidae			135
DCPA	Ceratopogonidae	<i>Palpomyia</i>	spp.	4
BSPI	Sphaeriidae	<i>Pisidium</i>	sp.	26
DTPI	Tipulidae	<i>Pilaria</i>	spp.	2
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	2
ELLE	Leptophlebiidae	<i>Leptophlebia</i>	sp.	7
AGGA	Gammaridae	<i>Gammarus</i>	sp.	7
AOXX	Oligochaetae			7
DCCU	Ceratopogonidae	<i>Culicoides</i>	spp.	1
TLIR	Limnephilidae	<i>Ironoquia</i>	spp.	3
TLLI	Limnephilidae	<i>Limniphilus</i>	sp.	1
TDPH	Dipseudopsidae	<i>Phylocentropus</i>	sp.	1
CDHY	Dytiscidae	<i>Hydroporus</i>	spp.	1
DSXX	Simuliidae			203
IACA	Asellidae	<i>Caecidotea</i>	sp.	2
TPPT	Phryganeidae	<i>Ptilostomis</i>	sp.	1
DPPA	Palaemonidae	<i>Palaemonetes</i>	<i>paludosus</i>	4
GLFO	Lymnaeidae	<i>Fossaria</i>	spp.	1
GVCA	Vivparidae	<i>Campeloma</i>	sp.	1

Collection Report

Location Code: C02020

Stream Name:

Stream Order:

Location: Trib to Dragon Swamp
@ Rt. 610 (Mascot)

Drainage: Piankatank

Sample Date: 8/29/200

Species Code	Family	Genus	Species	Quantity
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	86
CEMA	Elmidae	<i>Macronychus</i>	<i>glabratus</i>	2
OCHE	Corduliidae	<i>Helocordulia</i>	<i>sp.</i>	3
TPCH	Philopotamidae	<i>Chimarra</i>	<i>sp.</i>	1
CEST	Elmidae	<i>Stenelmis</i>	<i>spp.</i>	2
DCAX	Cambaridae			1
DCPR	Ceratopogonidae	<i>Probezzia</i>	<i>sp.</i>	1
THOX	Hydroptilidae	<i>Oxythira</i>	<i>sp.</i>	1
AOXX	Oligochaetae			10
DSXX	Simuliidae			5
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	1
DCXX	Chironomidae			120
CGDI	Gyrinidae	<i>Dineutes</i>	<i>sp.</i>	2
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	7
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	5
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	8
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	6
EEEE	Ephemerellidae	<i>Ephemerella</i>	<i>spp.</i>	1
ELHA	Leptophlebiidae	<i>Habrophlebia</i>	<i>spp.</i>	1

Collection Report

Location Code: C02021

Stream Name:

Stream Order:

Location: Dragon Swamp/White Marsh Cr near 605 off

Drainage: Piankatank

Sample Date: 8/27/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	1
GLPS	Lymnaeidae	<i>Pseudosuccinea</i>	<i>columella</i>	1
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	35
OABA	Aeshnidae	<i>Basiaeschna</i>	<i>sp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	2
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	2
AOXX	Oligochaetae			62
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	1
DCXX	Chironomidae			159
OLER	Libellulidae	<i>Erythemis</i>	<i>spp.</i>	1
GHMI	Hydrobiidae	<i>Micromenetus</i>	<i>spp.</i>	1
LICO	Libelluliidae/Corduliidae			2
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	3

Collection Report

Location Code: C02022

Stream Name:

Stream Order:

Location: Holme's Swamp @ Rt 610

Drainage: Piankatank

Sample Date: 8/27/200

Species Code	Family	Genus	Species	Quantity
AOXX	Oligochaetae			8
ECCA	Caenidae	<i>Caenis</i>	<i>sp.</i>	2
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	1
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	1
CEDU	Elmidae	<i>Dubiraphia</i>	<i>spp.</i>	1
BSSP	Sphaeriidae	<i>Sphaerium</i>	<i>sp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	79
OCEP	Corduliidae	<i>Epitheca</i>	<i>sp.</i>	1
CGGY	Gyrinidae	<i>Gyrinus</i>	<i>spp.</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	3
CGDI	Gyrinidae	<i>Dineutes</i>	<i>sp.</i>	1
DCXX	Chironomidae			162
DCAX	Cambaridae			1
DCOR	Cambaridae	<i>Orconectes</i>	<i>spp.</i>	1
OAIM	Aeshnidae	<i>Aeshnidae immature</i>		1
GHMI	Hydrobiidae	<i>Micromenetus</i>	<i>spp.</i>	2
DPPA	Palaemonidae	<i>Palaemonetes</i>	<i>paludosus</i>	6

Collection Report

Location Code: C02023

Stream Name:

Stream Order:

Location: Trib to Dragon Swamp
@ Rt 610 @ Coldwater

Drainage: Piankatank

Sample Date: 9/10/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DCXX	Chironomidae			0
<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
TLOE	Leptoceridae	<i>Oecetis</i>	<i>spp.</i>	2
HXXX				1
GHAM	Hydrobiidae	<i>Amnicola</i>	<i>spp.</i>	4
ELHA	Leptophlebiidae	<i>Habrophlebia</i>	<i>spp.</i>	1
AOXX	Oligochaetae			31
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	32
OCHE	Corduliidae	<i>Helocordulia</i>	<i>sp.</i>	3
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	4
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	4
OCIM	Coenagrionidae	<i>Immature 3</i>		
DCXX	Chironomidae			113
DSXX	Simuliidae			3
TPDU	Planariidae	<i>Dugesia</i>	<i>tigrina</i>	1
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	1
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	5
OANA	Aeshnidae	<i>Nasiaeschna</i>	<i>sp.</i>	1
DTHE	Tipulidae	<i>Hexatoma</i>	<i>spp.</i>	2
DCAX	Cambaridae			2
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	8

Collection Report

Location Code: C02024

Stream Name:

Stream Order:

Location: Trib of Dragon Swamp
off Rt 198 @ Glenn's

Drainage: Piankatank

Sample Date: 8/29/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
HXXX				2
OGXX	Gomphidae			2
MCNI	Corydalidae	<i>Nigronia</i>	<i>serricornis</i>	1
DCPA	Ceratopogonidae	<i>Palpomyia</i>	<i>spp.</i>	2
DCPR	Ceratopogonidae	<i>Probezzia</i>	<i>sp.</i>	2
TLOE	Leptoceridae	<i>Oecetis</i>	<i>spp.</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	1
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	1
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	3
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	65
DEHE	Empididae	<i>Hemerodromia</i>	<i>sp.</i>	3
OGDR	Gomphidae	<i>Dromogomphus</i>	<i>sp.</i>	1
GHXX	Hydrobiidae			1
DCXX	Chironomidae			84
DCAX	Cambaridae			1
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	4
AOXX	Oligochaetae			14
GLFO	Lymnaeidae	<i>Fossaria</i>	<i>spp.</i>	3
CEST	Elmidae	<i>Stenelmis</i>	<i>spp.</i>	1
GHMI	Hydrobiidae	<i>Micromenetus</i>	<i>spp.</i>	5
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	1
TPDU	Planariidae	<i>Dugesia</i>	<i>tigrina</i>	1

Collection Report

Location Code: C02025

Stream Name:

Stream Order:

Location: Exol Swamp @ Rt 615

Drainage: Piankatank

Sample Date: 9/10/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DCXX	Chironomidae			43
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	2
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	19
HXXX				1
LICO	Libelluliidae/Corduliidae			1
ECCA	Caenidae	<i>Caenis</i>	<i>sp.</i>	2
DCCH	Chaoboridae	<i>Chaoborus</i>	<i>punctapennis</i>	1
OLSY	Libellulidae	<i>Sympetrum</i>	<i>sp.</i>	1
GHAM	Hydrobiidae	<i>Amnicola</i>	<i>spp.</i>	3
AOXX	Oligochaetae			3
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	9
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	122
GVCA	Vivparidae	<i>Campeloma</i>	<i>sp.</i>	22
DPPA	Palaemonidae	<i>Palaemonetes</i>	<i>paludosus</i>	4
GHXX	Hydrobiidae			1
MSSI	Sialidae	<i>Sialis</i>	<i>sp.</i>	2
CGDI	Gyrinidae	<i>Dineutes</i>	<i>sp.</i>	1

Collection Report

Location Code: C02026

Stream Name: Exol Swamp

Stream Order:

Location: Exol Swamp @ Rt 612

Drainage: Piankatank

Sample Date: 9/10/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
IACA	Asellidae	Caecidotea	sp.	138
DCXX	Chironomidae			70
OLAR	Lestidae	Archlestes	spp.	1
OLSY	Libellulidae	Sympetrum	sp.	1
OCIS	Coenagrionidae	Ischnura	sp.	2
OLPA	Libellulidae	Pachydiplax	longipenis	5
DPPA	Palaemonidae	Palaemonetes	paludosus	1
CGDI	Gyrinidae	Dineutes	sp.	2
THCH	Hydropsychidae	Cheumatopsyche	spp.	3
TLOE	Leptoceridae	Oecetis	spp.	1
TPDU	Planariidae	Dugesia	tigrina	1
ECCA	Caenidae	Caenis	sp.	1
AOXX	Oligochaetae			5
BSSP	Sphaeriidae	Sphaerium	sp.	6
AGGA	Gammaridae	Gammarus	sp.	10
BSPI	Sphaeriidae	Pisidium	sp.	4

Location Code: C02100

Stream Name:

Stream Order:

Location: Rte 612 just south of Rte. 607 (Near Bestland)

Drainage: Piankatank

Sample Date: 2/5/2003

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
AOXX	Oligochaetae			3
PNPR	Nemouridae	Prostoia	sp.	19
BSPI	Sphaeriidae	Pisidium	sp.	1
DSXX	Simuliidae			201
TPPT	Phryganeidae	Ptilostomis	sp.	1
AGGA	Gammaridae	Gammarus	sp.	4
DCXX	Chironomidae			5

Collection Report

Location Code: C02101

Stream Name:

Stream Order:

Location: 2nd Trib Rte 610 North
of Rte 603

Drainage: Piankatank

Sample Date: 2/5/2003

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
DSXX	Simuliidae			11
ELLE	Leptophlebiidae	<i>Leptophlebia</i>	<i>sp.</i>	28
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	5
ELPA	Leptophlebiidae	<i>Paraleptophlebia</i>	<i>sp.</i>	6
AOXX	Oligochaetae			2
DTDI	Tipulidae	<i>Dicranota</i>	<i>spp.</i>	1
CEST	Elmidae	<i>Stenelmis</i>	<i>spp.</i>	1
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	5
GLPS	Lymnaeidae	<i>Pseudosuccinea</i>	<i>columella</i>	3
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	53
DCXX	Chironomidae			13
GVCA	Viviparidae	<i>Campeloma</i>	<i>sp.</i>	1
EEHE	Ephemeridae	<i>Hexagenia</i>	<i>sp.</i>	1
EEEE	Ephemerellidae	<i>Eurylophella</i>	<i>temporalis</i>	7
CDHY	Dytiscidae	<i>Hydroporus</i>	<i>spp.</i>	10
EMSI	Metreopodidae	<i>Siphloplectron</i>	<i>sp.</i>	21
GHMI	Hydrobiidae	<i>Micromenetus</i>	<i>spp.</i>	19
TDPH	Dipseudopsidae	<i>Phylocentropus</i>	<i>sp.</i>	2
TLPY	Limnephilidae	<i>Pycnopsyche</i>	<i>spp.</i>	4
TPPT	Phryganeidae	<i>Ptilostomis</i>	<i>sp.</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	6
PPIS	Perlodidae	<i>Isoperla</i>	<i>spp.</i>	9
PCAL	Capniidae	<i>Allocapnia</i>	<i>sp.</i>	3
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	8
PPCL	Perlodidae	<i>Clioperla</i>	<i>clio</i>	1
TLHY	Limnephilinae	<i>Hydatophylax</i>	<i>argus</i>	1
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	6

Collection Report

Location Code: C03001

Stream Name: Wilton Creek Trib

Stream Order:

Location: Rte 630/ Rte 33

Drainage: Piankatank

Sample Date: 12/16/20

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	3
EEEE	Ephemerellidae	<i>Ephemerella</i>	<i>spp.</i>	2
TDPH	Dipseudopsidae	<i>Phylocentropus</i>	<i>sp.</i>	1
DTPI	Tipulidae	<i>Pilaria</i>	<i>spp.</i>	1
DTCH	Tabanidae	<i>Chrysops</i>	<i>spp.</i>	1
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	2
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	21
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	32
CEST	Elmidae	<i>Stenelmis</i>	<i>spp.</i>	1
OABO	Aeshnidae	<i>Boyeria</i>	<i>vinosa</i>	1
AOXX	Oligochaetae			16
DTTA	Tabanidae	<i>Tabanus</i>	<i>spp.</i>	3
CEMA	Elmidae	<i>Macronychus</i>	<i>glabratus</i>	1
ELHA	Leptophlebiidae	<i>Habrophlebia</i>	<i>spp.</i>	5
TLHY	Limnephilinae	<i>Hydatophylax</i>	<i>argus</i>	1
CPAN	Ptilodactylidae	<i>Anchytarsus</i>	<i>bicolor</i>	4
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	1
DTTI	Tipulidae	<i>Tipula</i>	<i>abdominalis</i>	1
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	8
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	56
DCXX	Chironomidae			36
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	5
TPPT	Phryganeidae	<i>Ptilostomis</i>	<i>sp.</i>	2

Collection Report

Location Code: C03003

Stream Name: Piankatank Trib

Stream Order:

Location: Piankatank Rte. 620

Drainage: Piankatank

Sample Date: 12/16/20

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	3
ECCA	Caenidae	<i>Caenis</i>	<i>sp.</i>	1
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	18
OGHA	Gomphidae	<i>Hagenius</i>	<i>brevistylus</i>	1
CEMA	Elmidae	<i>Macronychus</i>	<i>glabratus</i>	2
CEST	Elmidae	<i>Stenelmis</i>	<i>spp.</i>	3
CEDU	Elmidae	<i>Dubiraphia</i>	<i>spp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	20
THCH	Hydropsychidae	<i>Cheumatopsyche</i>	<i>spp.</i>	7
EEEE	Ephemerellidae	<i>Eurylophella</i>	<i>temporalis</i>	4
DCPA	Ceratopogonidae	<i>Palpomyia</i>	<i>spp.</i>	16
AOXX	Oligochaetae			2
OCIM	Coenagrionidae	<i>Immature</i>		1
OGGO	Gomphidae	<i>Gomphus</i>	<i>sp.</i>	1
THHY	Hydropsychidae	<i>Hydropsyche</i>	<i>spp.</i>	2
DCXX	Chironomidae			116
OCCA	Calopterygidae	<i>Calopteryx</i>	<i>spp.</i>	1
TDPH	Dipseudopsidae	<i>Phylocentropus</i>	<i>sp.</i>	4
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	19
OABA	Aeshnidae	<i>Basiaeschna</i>	<i>sp.</i>	1
DSXX	Simuliidae			3
TPPO	Polycentropodidae	<i>Polycentropus</i>	<i>spp.</i>	1
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	3
ELLE	Leptophlebiidae	<i>Leptophlebia</i>	<i>sp.</i>	1
DTHE	Tipulidae	<i>Hexatoma</i>	<i>spp.</i>	1
TPCH	Philopotamidae	<i>Chimarra</i>	<i>sp.</i>	4

Collection Report

Location Code: C03008

Stream Name: Carvers Creek

Stream Order:

Location: Rte 198

Drainage: Piankatank

Sample Date: 3/19/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
PERL	Perlidae	<i>Immature</i>		2
HCTR	Corixidae	<i>Trichocorixa</i>	<i>sp.</i>	1
PTTA	Taeniopterygidae	<i>Taeniopteryx</i>	<i>spp.</i>	1
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	2
DSXX	Simuliidae			2
DTTA	Tabanidae	<i>Tabanus</i>	<i>spp.</i>	1
PCAL	Capniidae	<i>Allocapnia</i>	<i>sp.</i>	2
EEHE	Ephemeridae	<i>Hexagenia</i>	<i>sp.</i>	6
GHXX	Hydrobiidae			7
GHMI	Hydrobiidae	<i>Micromenetus</i>	<i>spp.</i>	2
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	9
GLFO	Lymnaeidae	<i>Fossaria</i>	<i>spp.</i>	1
DCXX	Chironomidae			119
EEEE	Ephemerellidae	<i>Eurylophella</i>	<i>temporalis</i>	2
EEEE	Ephemerellidae	<i>Ephemerella</i>	<i>spp.</i>	24
AOXX	Oligochaetae			7
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	3
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	19
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	4
GVCA	Vivparidae	<i>Campeloma</i>	<i>sp.</i>	7
EHST	Heptageniidae	<i>Stenonema</i>	<i>modestum</i>	1
TLPY	Limnephilidae	<i>Pycnopsyche</i>	<i>spp.</i>	3
TLIR	Limnephilidae	<i>Ironoquia</i>	<i>spp.</i>	3
CEDU	Elmidae	<i>Dubiraphia</i>	<i>sp.</i>	2
CHPE	Haliplidae	<i>Peltodytes</i>	<i>sp.</i>	1

Collection Report

Location Code: C03015

Stream Name: Carver's Creek

Stream Order:

Location: Carver's Creek below Rt
610

Drainage: Piankatank

Sample Date: 3/19/200

<i>Species Code</i>	<i>Family</i>	<i>Genus</i>	<i>Species</i>	<i>Quantity</i>
GLPS	Lymnaeidae	<i>Pseudosuccinea</i>	<i>columella</i>	3
GPPH	Physidae	<i>Physa</i>	<i>sp.</i>	1
DTTA	Tabanidae	<i>Tabanus</i>	<i>spp.</i>	1
OGDR	Gomphidae	<i>Dromogomphus</i>	<i>sp.</i>	1
GHXX	Hydrobiidae			25
OCIM	Coenagrionidae	<i>Immature</i>		1
OLPA	Libellulidae	<i>Pachydiplax</i>	<i>longipenis</i>	1
ECCA	Caenidae	<i>Caenis</i>	<i>sp.</i>	7
AGGA	Gammaridae	<i>Gammarus</i>	<i>sp.</i>	2
OCEM	Coenagrionidae	<i>Enallagma</i>	<i>spp.</i>	2
EBBA	Baetidae	<i>Baetis</i>	<i>spp.</i>	1
BSPI	Sphaeriidae	<i>Pisidium</i>	<i>sp.</i>	7
BSSP	Sphaeriidae	<i>Sphaerium</i>	<i>sp.</i>	1
GAFE	Ancylidae	<i>Ferrissia</i>	<i>sp.</i>	1
DCCU	Ceratopogonidae	<i>Culicoides</i>	<i>spp.</i>	17
AOXX	Oligochaetae			6
CDHY	Dytiscidae	<i>Hydroporus</i>	<i>spp.</i>	2
DCXX	Chironomidae			168
IACA	Asellidae	<i>Caecidotea</i>	<i>sp.</i>	6
GVCA	Vivparidae	<i>Campeloma</i>	<i>sp.</i>	5
DCPR	Ceratopogonidae	<i>Probezzia</i>	<i>sp.</i>	4

APPENDIX III

**Macroinvertebrate Collections
Dragon Run Watershed**

**Virginia Commonwealth University
Center for Environmental Studies**

Mollusk Collections

Location code: C02011 *Stream name:* Holmes Swamp *Stream Order:*
Location name: Holmes Swamp Rte 616 *Drainage:* Piankatank

<i>Location Code</i>	<i>Date</i>	<i>Genus</i>	<i>Species</i>	<i>Live</i>	<i>Shell</i>
C02011	2/3/2003	<i>Elliptio</i>	<i>icterina</i>		1
C02011	2/3/2003	<i>Elliptio</i>	<i>complanata</i>		9
C02011	8/27/2003	<i>Elliptio</i>	<i>complanata</i>		3

Location code: C02013 *Stream name:* Un-named *Stream Order:*
Location name: Un-named Tributary Route 610 *Drainage:* Piankatank
 South of 603

<i>Location Code</i>	<i>Date</i>	<i>Genus</i>	<i>Species</i>	<i>Live</i>	<i>Shell</i>
C02013	2/3/2003	<i>Elliptio</i>	<i>icterina</i>		1
C02013	2/3/2003	<i>Elliptio</i>	<i>complanata</i>		1

Mollusk Collections

Location code: C02020 **Stream name:** **Stream Order:**

Location name: Trib to Dragon Swamp @ Rt. 610 (Mascot) **Drainage:** Piankatank

Location Code	Date	Genus	Species	Live	Shell
C02020	8/29/2003	<i>Elliptio</i>	<i>complanata</i>		1

Location code: C02024 **Stream name:** **Stream Order:**

Location name: Trib of Dragon Swamp off Rt 198 @ Glenn's **Drainage:** Piankatank

Location Code	Date	Genus	Species	Live	Shell
C02024	8/29/2003	<i>Elliptio</i>	<i>complanata</i>	4	1

Location code: C03008 **Stream name:** Carvers Creek **Stream Order:**

Location name: Rte 198 **Drainage:** Piankatank

Location Code	Date	Genus	Species	Live	Shell
C03008	3/19/2003	<i>Elliptio</i>	<i>complanata</i>		1
C03008	3/19/2003	<i>Elliptio</i>	<i>congaraea</i>		1

Mollusk Collections

Location code:** C03015 **Stream name:** Carver's Creek **Stream Order:

***Location name:** Carver's Creek below Rt 610 **Drainage:** Piankatank*

<i>Location Code</i>	<i>Date</i>	<i>Genus</i>	<i>Species</i>	<i>Live</i>	<i>Shell</i>
C03015	3/19/2003	<i>Elliptio</i>	<i>complanata</i>	2	2