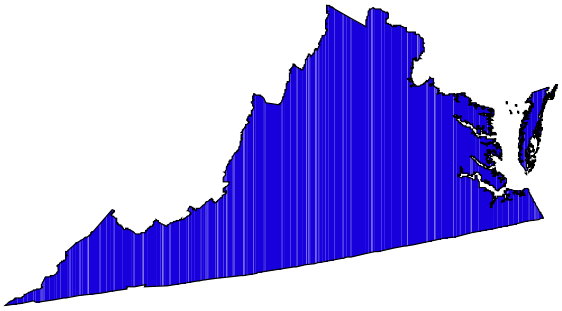
A Stream Condition Index for Virginia Non-Coastal Streams



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ACRONYMS AND ABBREVIATIONS

AAC	Academic Advisory Committee
BIOMON	Acronym for Virginia DEQ historical biological monitoring database
CA	Correspondence Analysis
CPMI	Coastal Plain Macroinvertebrate Index
DCA	Detrended correspondence analysis
DEP	Division of Environmental Protection (West Virginia)
DEQ	Department of Environmental Quality (Virginia)
DRG	Digital Raster Graphics
EDAS	Ecological Data Application System (database software)
EMAP	Environmental Monitoring and Assessment Program
EPA	Environmental Protection Agency (U.S.)
GIS	Geographic Information System
GMU	George Mason University
HUC	Hydrologic Unit Code
IBI	Index of Biotic Integrity
IQR	Interquartile range
MACS	Mid-Atlantic Coastal Streams
MAHA	Mid-Atlantic Highlands Assessment
MBSS	Maryland Biological Stream Survey
NHD	National Hydrological Data Set
NMS	Non-metric multidimensional scaling
PCA	Principal Components Analysis
PCoA	Principal Coordinates Analysis
QA/QC	Quality Assurance/Quality Control
RBP	Rapid Bioassessment Protocols
RF3	Reach File 3
RSAT	Rapid Stream Assessment Technique
SCI	Stream Condition Index
VCU	Virginia Commonwealth University
VDEQ	Virginia Department of Environmental Quality
WVSCI	West Virginia Stream Condition Index
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
WQ	Water Quality

1. Executive Summary

Over the past century, land use activities such as mining, agriculture, urbanization, and industrialization have seriously threatened the quality of surface waters by contributing to nonpoint-source pollution. It is the responsibility of Virginia Department of Environmental Quality (DEQ) to maintain and protect the physical, chemical and biological integrity of the state's waters. In keeping with the Clean Water Act and current technical guidance from USEPA, this report shows the development of a proposed benthic stream condition index (SCI) for benthic macroinvertebrates in upland streams of Virginia (above the Fall Line). The area covered by this report includes the Piedmont, the Blue Ridge, the Ridge and Valley (including the Great Valley), and the Central Appalachians. The index for streams and small rivers is an important assessment tool for the establishment of biological criteria in Virginia.

Bioassessment consists of comparing the biological condition of a stream to a reference condition, which is an aggregate of conditions in unimpaired streams of a region. Reference conditions are "best available" conditions where biological potential is at its highest for the particular region or area. These reference conditions are representative of sustainable ecosystem health.

Biocriteria: *under the Clean Water Act, numerical values or narrative statements that define a desired biological condition for a waterbody and are part of the WQ standards.*

Bioassessments: *evaluations of the biologicalcondition of a waterbody that use surveys of the resident biota.*

Biosurveys: *the collection, processing, and analysis of representative portions of a resident biotic community or assemblage.*

For Virginia, a single biological region for upland streams is sufficient. Partitioning the streams and watersheds further into Level III ecoregions does not improve biological assessment. Biological information derived from a stream is aggregated into a benthic stream condition index (SCI) for Virginia. This SCI can be used as a primary indicator of ecosystem health and can identify impairment with respect to the reference (or natural) condition. The index includes eight biological attributes, called metrics, that represent elements of the structure and function of the bottom-dwelling macroinvertebrate assemblage. Metrics are specific measures of diversity, composition, and tolerance to pollution, and when combined into a multimetric index can integrate biological community characteristics and measure the overall response of the community to environmental stressors.

Core Metrics

- EPT taxa
- Total taxa
- % Ephemeroptera
- % Plecoptera plus Trichoptera less Hydropsychidae
- % Chironomidae
- % Top 2 Dominant Taxa
- HBI (Family biotic index)
- % Scrapers

See definitions in Table 3-3.

The SCI was developed with monitoring data collected in 1994-1998, and was tested with data collected in 1999-2002. The test data confirmed the ability of the index to detect biological impairment, as well as the initial classification. Initial and test data were combined to develop the final SCI.

The complete fixed-site data set (to 2002) was sufficient to develop the SCI and biocriteria for Virginia upland streams. The index has been tested and confirmed, and is appropriate for operational use in bioassessment and application of biocriteria.

The SCI analysis identified several recommendations to improve and optimize VDEQ's biological monitoring:

- Biocriteria – the SCI developed here can be used for biocriteria to support aquatic life use. We recommend using the 10^{th} percentile of the SCI score distribution as the biocriterion.

- Virginia DEQ sampling methods – VDEQ has made important strides in standardizing biological sampling methodology throughout the state. We recommend programmatic commitment to methods standardization and QA in upland streams, as well as in Coastal Plain streams. Standardization, QA, and resultant data quality will ensure that DEQ's data and biocriteria are scientifically defensible.

- Monitoring Program Sampling Design – We recommend that VDEQ move away from the fixed-site network, which has severe limitations:
  - Repeated sampling of fixed sites is only necessary for special studies and trend assessment
  - A single index period is sufficient for monitoring and assessment
  - A specific sampling design (probability-based or model-based) will allow unbiased assessment of the condition of Virginia waters, as well as regions within the state.

- Further testing of the index – As VDEQ's monitoring program matures, data will become available for periodic re-evaluation and recalibration of the index. In addition, there is an immediate need to identify and sample reference sites in the Central Appalachians (Coalfields region of southwestern Virginia).

2. Introduction

Virginia's Department of Environmental Quality (DEQ) has conducted qualitative and semi-quantitative biological monitoring since the early 1970s, and has been using USEPA's 1989 Rapid Bioassessment Protocols (RBP) (Plafkin et al. 1989), with modifications, since 1990 (VDEQ 2000). Under DEQ's current 1989 RBP-based framework, each DEQ-monitored site is paired with a single reference site to characterize the expected condition of undisturbed biota. Reference sites are ideally selected to match as closely as possible the natural characteristics of the targeted monitoring sites (e.g., ecoregion, gradient, land use, stream order) and to be as representative as possible of natural, undisturbed conditions. Benthic macroinvertebrate data from monitored and reference sites are used to calculate eight standard metrics recommended in Plafkin et al. (1989). Multimetric scoring procedures comparing each monitored site to a single designated reference site are used to derive a water quality rating for the monitored site in one of four categories: non-impaired, slightly impaired, moderately impaired, and severely impaired. Ratings based on biological monitoring are used in various state programs, including Clean Water Act §305(b) reporting and §303(d) listing.

Virginia's biomonitoring and assessment program has developed and exhibited many strengths during the past decade, derived from the state's adoption of a consistent sampling protocol since 1990 (USEPA's 1989 RBP). Virginia DEQ, with technical assistance from USEPA Region 3, is currently undergoing a planning process to bring its biomonitoring and bioassessment methods up-to-date with current recommended practice in the mid-Atlantic region. Planned improvements include updating agency sampling methods as well as improving the statewide consistency with which they are applied, moving from a paired-reference-site approach to a regional reference condition approach, and developing one or more regionally-calibrated multimetric macroinvertebrate indexes for assessing biological condition of streams.

Over the past decade, biological assessment methods for streams and small rivers have been refined and improved with increased research and testing, such that a major revision of USEPA's RBP was published in 1999 (Barbour et al. 1999). Virginia DEQ is in the process of updating its biomonitoring methods from the 1989 RBPs to the recommended 1999 Rapid Bioassessment Protocols.

Virginia's biomonitoring program is performed under an administratively decentralized system, wherein regional biologists in six different administrative areas of the state perform field sampling and data analysis for their respective administrative regions. State biomonitoring personnel are capable and thorough field investigators who are fully familiar with the RBP sampling and analysis approach; yet, each administrative region historically has followed individual preferences in some of the methods within the overall RBP approach. These variations have been of little consequence while comparisons were restricted to single reference sites, but for development of a statewide, ecoregionally calibrated index, the district

methodological differences contribute to variability of the data. Improvements to the consistency of methods applied throughout the statewide monitoring effort have been proposed (Barbour and Burton 2002), with the only remaining methodological differences to be those dictated by natural division (e.g., using a 20-jab macroinvertebrate collection method in the Coastal Plain and Southeast Plains ecoregions, and continued riffle sampling in upland ecoregions).

The purpose of this study was to develop a multimetric biological index calibrated from Virginia data for use in assessment of Virginia streams. State stream assessment data from 1994 through 1998 were used to test for possible bioregion classifications and to develop the index. Specific questions investigated in this study are:

a. Are the existing fixed-site data sufficient to develop biocriteria for Virginia?

b. Do the data indicate variability due solely to methods differences between the VDEQ regional offices?

c. What is the most appropriate site classification for assessing ecosystem health across Virginia?

d. What, if any, are the seasonal differences in biological metrics? Are two index periods required for monitoring?

e. Which metrics are most appropriate for use in a Virginia multimetric macroinvertebrate stream condition index?

f. What thresholds indicate the degree of comparability of Virginia streams to reference condition?

g. What improvements can be made to better define the reference condition for ecosystem health of Virginia streams?

3. Analytical Methods

Our analytical approach in this project generally followed the steps used in similar efforts in other states and regions (e.g., Barbour et al. 1996, Smith and Voshell 1997, Stribling et al. 1998, Gerritsen et al. 2000, Maxted et al. 2000). This approach proceeded through a general stepwise framework as follows, but was an iterative process in which steps three through five overlapped and were revisited throughout the process.

Steps in Biological Index Development

1. Develop the database
2. Identify reference criteria and reference sites
3. Determine site classification strata
4. Examine potential metrics for responsiveness
5. Aggregate responsive metrics into a condition index

3.1 Virginia biomonitoring data

Virginia's biomonitoring data analyzed in this study were collected from 1994 through 1998. The data include a variety of site types and studies, ranging from special studies for which a site was sampled only once during the five-year period, to a regular network of sites where samples were collected twice per year (targeted for Spring and Fall). The biomonitoring data were collected from 330 fixed statewide sampling sites, with the number of samples per site over the five-year period ranging from one to ten. Most benthic macroinvertebrate sampling was clustered in Spring and Fall months (March-June and September-November), but there were some samples taken in almost every month of the year. Most field biologists used a 100 organism target subsample count, but some counted 200 organisms; and, organisms from some samples were picked alive in the field, while others were preserved and subsampled in the lab (Seivard 1999, personal communication). Subsampling was performed using a gridded pan method according to procedures detailed in Chapter 6 and Appendix B of Plafkin et al. 1989. Organisms were identified to Family taxonomic level. Physical habitat data consisted of twelve Rapid Bioassessment Protocols (RBP) habitat parameters adapted from Plafkin et al. (1989) in which each parameter was scored by visual inspection on a scale from zero to 20 points. Water quality data collected at the time of macroinvertebrate sampling consisted of six basic field parameters, of which four (water temperature, dissolved oxygen, pH, and conductivity) provided measurements at most sites for most dates sampled. Most measurements were missing for the other two parameters (chlorine and salinity).

Biologists in the coastal plain region of Virginia have revised their sampling methods and assessment procedures to correspond to a multi-state effort at improving monitoring and assessment in mid-Atlantic coastal streams (Maxted et al. 2000). Because of this, the data considered for this current project excluded coastal plain data and focused on the non-coastal areas in the Piedmont and mountain and valley physiographic provinces of the state. Resulting non-coastal Virginia data on which this report is based are described by the following summary and in Table 3-1 and Appendices A through D.

Summary Description of Applicable Data

- Period of record 1994-1998
- 938 benthic samples in 278 non-coastal sites
- One to 10 samples per site
- Sampling dates clustered in broad Spring and Fall periods
- Invertebrates subsampled to 100-200 organisms
- Some subsamples field-picked, some lab-picked
- 111 different taxa identified to Family level
- Twelve physical habitat parameters

Multiple observations at single sites (up to 10 in these data) may be a form of pseudoreplication (Hurlbert 1984). In pseudoreplication, multiple observations are treated as independent from one another (in statistical analysis) when they are actually replicates, e.g., multiple observations of the same object. While we did not examine serial autocorrelation in these data, benthic macroinvertebrate samples one year apart have been demonstrated to be independent (Barbour et al. 1996). In order to facilitate the exploratory and developmental data analysis here, we elected to use all samples and we assumed independence among the samples.

3.2 Database development

We obtained historic data from the Virginia DEQ biological monitoring program's database (BIOMON), consisting of benthic macroinvertebrate, physical habitat, and basic water chemistry data collected from 1994 through 1998 (Table 3-1). These data were transferred into a custom data management system called EDAS (Ecological Data Application System, version 2.1) (Tetra Tech 1999), developed for use with Microsoft Access®. In EDAS, data, metadata, and other information reside in a series of relational tables. Custom-designed queries have been built into EDAS to calculate and export biological metrics and other information for further analysis.

Consultation with DEQ personnel provided valuable data quality review and database revisions in a number of areas. Geographic data (latitudes and longitudes) and stream order designations were obtained for many stations (incomplete in BIOMON), and incorrect entries were updated.

Sampling sites that originally had been entered into BIOMON under multiple site codes were identified and corrected so as not to be counted as different sites in the data set, and their corresponding habitat, water quality, and macroinvertebrate data were reconciled. Because the original BIOMON database placed zeroes in its habitat and chemical data tables if no values were entered (Seivard 1999, personal communication), all such zero-value data were treated as missing values. Some taxa tolerance values and functional feeding group designations were provided in BIOMON, and these were verified and supplemented (where absent) by consulting DEQ biologists, Merritt and Cummins 1996, Barbour et al. 1999, and professional judgment of the Tetra Tech project team.

3.3 Reference criteria and sites

Reference sites used in this analysis were identified two ways: by professional judgment of DEQ biologists; and by objective criteria applied to the data. Sites identified by either process were expected to be representative of least-impaired, best available, non-biological stream conditions. First, Virginia DEQ regional biologists submitted an initial set of candidate reference sites for their respective administrative regions based on their professional judgment and experience in those regions. Second, and separately, the following non-biological reference selection criteria was applied to individual samples in the database:

- Dissolved oxygen $\geq$ 6.0 mg/L
- pH between 6.0 and 9.0 (inclusive)
- Conductivity <500 umhos/cm
- Epifaunal substrate score $\geq$ 11
- Channel alteration score $\geq$11
- Sediment deposition score $\geq$ 11
- Bank disruptive pressure score $\geq$11
- Riparian vegetation zone width score $\geq$ 6
- Total habitat score $\geq$ 120

The criteria were applied on a per-sample basis to the data, and candidate reference sites were chosen by evaluating how consistently samples from each site met all of the above reference selection criteria. The resulting pool of candidate reference sites included some sites that were identified only by DEQ biologists, some sites that were identified only by applying the above listed non-biological criteria, and some sites that were identified by DEQ biologists as well as met the non-biological criteria. Sites selected by non-biological criteria were also submitted to DEQ regional biologists for further review, and some of the initial candidate sites in that group were eliminated based on the biologists' awareness of significant non-point source pollution; nearby upstream point source discharges, impoundments, or other channel alteration; or other known anthropogenic activities or disturbances.

Further review of candidate reference sites was based on watershed land cover data provided by the EPA Region 3 office in Wheeling, West Virginia, based on 1:100,000 scale digital elevation models for Virginia and Multi-Resolution Land Cover data. In addition, reference sites were located only on first to fourth order streams.

A final set of 62 reference sites was identified (Appendix A), composed of sites from each of the selection methods and each having from one to ten samples over the five-year, 1994-1998, data period (Table 3-2; Figure 3-1). Samples from the same site but collected in different seasons were treated as separate observations, so that the total number of observations in reference sites was 247 samples. Specific characteristics and data describing reference sites and samples are reported in Appendix A and B.

3.4 Site classification

Aquatic biological systems across a geographic range vary naturally in composition and diversity of fauna depending on inherent differences in natural factors such as the geomorphology and physico-chemical characteristics of watersheds in which the organisms reside. Partitioning this natural variability into relatively homogenous classes can aid in establishing reference conditions for the macroinvertebrate community.

Alternative classifications. In addition to natural factors, sampling and design artifacts may confound our ability to develop reliable natural classification of sites. We examined five alternative classifications:

- Stream order – stream size (as expressed by Strable order) may determine presence or absence of invertebrate species
- Ecoregion and subecoregion – with special emphasis on differences between limestone-influenced streams and non-calcareous streams
- Alkalinity and stream gradient – (or surrogate measures), because many of the physical-chemical differences among ecoregions may be explained as effects of alkalinity or gradient
- Season of sampling, because the VDEQ sampling protocol calls for two index periods, in spring and in fall
- Reference selection criteria – The two sets of selection criteria that were used to select reference sites (Section 3.3): best professional judgment and numeric habitat criteria.

- VDEQ administrative region – region is responsible for sampling a fixed area of the state, and as explained in Chapter 2, each region had its own variations on the sampling method, which may produce artificial differences due to methodological bias rather than to natural differences.

Methods for the alternative classifications are explained below.

Ecoregions. Geographic partitioning into USEPA Level III Ecoregions and Level IV Subregions has been generally accepted as a likely framework for partitioning natural variability of aquatic macroinvertebrate communities (Omernik 1987, 1995). We obtained updated geographic data for Levels III and IV ecoregions in Virginia from the EPA Region 3 office in Wheeling, West Virginia (Woods et al. 1999) and used this data set to supplement ecoregion information provided by DEQ. Virginia data in this analysis were collected from sites in five Level III ecoregions: Piedmont (No. 45), Northern Piedmont (No. 64), Blue Ridge Mountains (No. 66), Ridge and Valley (No. 67), and Central Appalachians (No. 69) (Figure 3-1). We first examined whether modified Level III ecoregions accounted for variability of biota among sites. The modification entailed dividing Ridge and Valley data into two classes, one class comprising sites in the Northern and Southern Limestone/Dolomite Valleys (subecoregions 67a and 67f) and the other class comprising sites in this ecoregion's remaining subecoregions (ridges and shale valleys). We did this to explore whether the limestone/dolomite valleys would clearly segregate as a distinct bioregion.

Number of Sites (Samples) per Ecoregion Class

Ecoregion		Reference Sites (Samples)
45	Piedmont	4 (22)
64	Northern Piedmont	7 (48)
66	Blue Ridge	8 (22)
67a,f	Limestone valley sites within the Ridge & Valley	15 (64)
67	Ridge & Valley (without subregions a, f)	23 (82)
69	Central Appalachians	5 (9)

Conductivity/gradient. In addition, we examined an alternative four-group classification arrangement in which sites were divided into classes of high and low conductivity and gradient. In the absence of alkalinity data, we used the existing DEQ specific conductivity data as a surrogate. We thought that conductivity would be a reasonable surrogate for alkalinity for our purposes of exploring classification in the least-impacted reference sites, but realized that conductivity would likely not be a reliable surrogate for alkalinity in impacted sites. The range of conductivity measures in reference samples was predictably low as a result of conductivity having been used as a selection criterion for reference condition. The range was divided at 150 umhos, or the approximate 70th percentile (Figure 3-2a). Reference sites having the majority of their conductivity observations above 150 umhos were placed in the "high" conductivity classes, and reference sites having the majority of their conductivity observations less than 150 umhos were classed as "low."

Gradient class was assigned on the basis of "average percent slope of the watershed" for each site. Note that this is average slope of the catchment for each site and not actual stream gradient. Most watershed delineations were derived using 1:100,000 digital elevation model and an ArcView extension, Basin 1 (Petras 2000). However, when the results did not seem reasonable when comparing the resulting polygon to the National Hydrological Dataset (NHD), a different method was used. Several of the smaller watersheds were delineated using the Basin 1 extension and 1:24,000 digital elevation model. Several others were edited or completely digitized on-screen using a combination of 1:24,000 USGS Digital Raster Graphics (DRG), existing HUC coverages, the NHD, and best professional judgement of EPA's GIS specialist.

The range of calculated slopes was divided at the approximate 50th percentile, or about 16 percent slope, to separate the somewhat arbitrary "high" from "low" classes for this exercise (Figure 3-2b). Since a majority of reference sites for this project are located in the upland regions of non-coastal Virginia as opposed to the rolling Piedmont, a high percentage of the reference site gradients are predictably "high." EPA's GIS procedures produced catchment slope percentages for 39 of the 62 reference sites. Other reference sites for which GIS gradient data were not available were assigned to a "high" or "low" gradient class by Tetra Tech by consulting topographic maps. The resulting number of sites and samples in each conductivity/gradient class compared with each ecoregion class is reported in the box above (Also see Figures 3-3a and 3-3b).

Number of Sites (Samples per Conductivity/Gradient Class

Number of reference sites (samples) in conductivity/gradient classes compared with ecoregion classes (AH=conductivity-high, AL=conductivity-low, GH=gradient-high, GL=gradient-low).

Ecoregion	AHGL	AHGH	ALGL	ALGH	***Total***
45			3(20)	1(2)	***4(22)***
64		1(5)	3(16)	3(27)	***7(48)***
66		1(1)	2(3)	5(18)	***8(22)***
67	2(4)	2(13)	8(27)	11(38)	***23(82)***
67af	12(46)		2(13)	1(5)	***15(64)***
69	1(2)	4(7)			***5(9)***
Total	**15(52)**	**8(26)**	**18(79)**	**21(90)**	**62(247)**

Index period. A third classification was examined on the basis of time of year that samples were collected. Sample collection dates were clustered in two broad index periods of Spring (March 13 - June 30) and Fall (August 18 - December 17) (Figure 3-4; Table 3-2). Fourth, we examined whether there was a difference in biota in reference sites on the basis of how the sites were identified. A fifth classification was examined based on stream order, and a sixth classification was examined based on VDEQ administrative region (Figure 3-1).

Statistical analysis. Alternative classifications of reference sites were explored using statistical techniques known as ordination. Ordination analysis is a means of reducing the complexity of data so that it can be visualized graphically and examined with more conventional exploratory analysis. People are accustomed to visualizing and expressing data relationships in one dimension (line), in two dimensions (plane), and sometimes in three dimensions (space). It is easy to plot two variables at a number of sites, as an x-y scatter plot (Figure 3-5). Through isometric or perspective drawing, we can express a three-dimensional scatter plot on a two-

dimensional page (Figure 3-6), but how do we express, say, the abundances of four species? Or, the 111 families in the Virginia data set? It would be possible to graph them two or three at a time, but the number of graphs required quickly becomes too great. Ordination solves this problem by reducing the number of dimensions, so that the sites (or species) can be visualized, and so that we can examine relationships among groups of associated variables.

How ordination works is most easily explained with an analogy to regression analysis. In fact, one of the ordination methods, principal components analysis, is a multivariate extension of regression. Consider the relationship between two variables, alkalinity and magnesium concentration (Figure 3-5), showing a strong association. For these data, regression analysis defines a regression line. In ordination, we create a new axis defined by the regression line, and translate the origin to the mean of the distribution (Figure 3-7). We have thus changed the relationship by defining a principal axis that contains most of the variation, and a second axis only with residual scatter. In this case, it is essentially a one-dimensional relationship, given by the regression line: a linear combination of both x and y. A two-dimensional ordination for the three-variable case (Figure 3-6) is obtained by plotting the projection of the points onto a plane. The result is displayed by the heavy lines in Figure 3-8: here we have reduced three dimensions to two. The principal axes are given by the heavy dashed lines. In this case, the two principal axes are linear combinations of the three variables.

The objective of ordination is to express the data in at most three or four axes (more than four really doesn't help much over the original number of variables). Each axis represents an association (correlation) among multiple variables in the data set. Ideally, the ordination must account for a substantial amount of the variation in the original data, and each axis must contribute more than could be done with a random axis.

The results of an ordination can be visualized with scatterplots of the samples in the reduced "ordination space" of two or three dimensions. The axes do not represent any physical or tangible characteristics of the data. Rather, the relative locations of samples (points) plotted within the axes indicate how similar the taxonomic compositions of the various samples are to each other. In other words, samples plotted close together are more similar to each other in community composition (relative abundance of the various taxa found at the site) than are samples that are plotted farther apart. The positions of the various sample points relative to other sample points is what reveals patterns of similarity or dissimilarity in the data. This plotting of sample points based on their relative similarities is analogous to creating a map using only a set of distances between multiple pairs of cities without any absolute map references such as a north-south compass. In the case of our ordination of biological samples, the "distance" between two samples is their degree of similarity as measured by a similarity index. Further ordination techniques are then used to explore relationships between the taxa composition patterns and various categories of environmental data (i.e., ecoregions, index periods, conductivity/gradient groupings, reference-type classes described in previous paragraphs), again reducing complex multivariate data to a two- or three-dimensional representation of sample similarities. For more

background on ordination, please refer to The Ordination Web Page: Ordination Methods for Ecologists at http://www.okstate.edu/artsci/botany/ordinate/ (Palmer 2001) and An Introduction to Ordination at http://userwww.sfsu.edu/~efc/classes/biol710/ordination/ordination.htm (Clark 2001).

There are four major ordination methods that have been used successfully with ecological data: principal components analysis (PCA) and related methods; principal coordinates analysis (PCoA); correspondence analysis (CA); and nonmetric multidimensional scaling (NMS). Computationally, ordination methods use either a distance or a similarity matrix among sites or among variables, and calculate eigenvalues of the distance matrix to define the principal axes, or use a numerical approximation technique (NMS). There are many distance and similarity coefficients (Legendre and Legendre 1998). PCA uses only covariance or correlation coefficients as the similarity measure among variables, and CA uses only chi-square as the similarity measure among either variables or observations. The other two methods can use any similarity or distance measure among observations (sites). For a complete explanation of these methods, see Legendre and Legendre (1998).

For the Virginia data, we used non-metric multidimensional scaling (NMS). This method has been shown to be robust for ordination of species composition (e.g., Kenkel and Orloci 1986, Ludwig and Reynolds 1988) and has been used successfully for classification of stream communities (e.g., Barbour et al. 1996, Gerritsen et al. 2000, Reynoldson et al. 1997). The NMS ordination (McCune and Mefford 1995) follows the procedure of Kruskal (1964). The final ordination was required to have a stress coefficient (a measure of goodness-of-fit of the ordination to the original data) of less than 20%. This usually required three ordination axes. The final NMS configuration was plotted as a scatterplot to determine any obvious groupings and to evaluate alternative classes. Separate scatterplots were examined for each of these six alternative classification groupings: ecoregions, conductivity/gradient groupings, index period, reference-selection-type, stream order, and DEQ administrative region. Classifications suggested by the scatterplots were explored using boxplots of metrics calculated separately and representing various specific attributes of the benthic community in each sample (see Section 3.5).

3.5 Metrics

A *metric* is a measureable characteristic of the biotic community; metrics useful in bioassessment are those that change in some predictable way with increased environmental disturbance.

Macroinvertebrate data (taxa identifications and counts) from each reference sample were used to calculate 30 different biological metrics. A master list of all unique taxa found in this 1994-1998 Virginia data set is reported in Appendix C. Metrics are numeric measures that quantitatively characterize different attributes of the macroinvertebrate community. The attributes of the community that are measured by these metrics fall into several categories of benthic community characteristics, and the specific metrics within those categories can indicate different aspects of community condition (see text box below). For example, metrics dealing

with taxonomic richness, such as Total Taxa, can be used as indicators of community health because an ecologically healthy system is generally expected to support a greater diversity of fauna than can be supported in an ecologically impaired area. Multiple metrics evaluated together can give an overall indication of ecological integrity.

The 30 specific metrics calculated from Virginia data represent each of the categories described in this text box except for habit (Table 3-3). Although habit metrics have been used successfully in many studies, we considered them to be unreliable for family-level data, because in many cases different genera within the same family have different habits. Specific metrics considered as candidates for the Virginia data are listed in Table 3-3 along with each metric's expected response to stressors.

Metric Categories

- *Taxonomic richness/diversity* – counts of distinct taxa within selected taxonomic groups.
- *Taxonomic composition* – proportions of individuals belonging to specific selected taxonomic groups.
- *Functional feeding group* – dominant mode of feeding, though not the specific nutritional source or benefits (e.g., suspension feeder, predator).
- *Habit* – dominant behavior of an animal for moving and maintaining physical position in its habitat (e.g., sprawling, clinging, burrowing).
- *Degree of tolerance* – counts, proportions, or weighted scores of taxa based on ability to survive exposure to pollutants.

See Table 3-3 for complete listing.

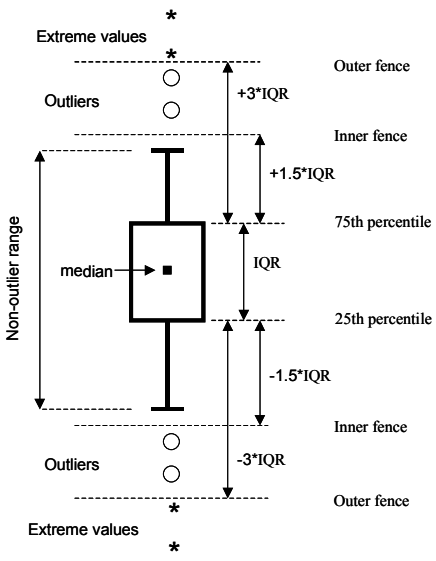
As defined above, a metric is expected to change in some predictable way as disturbance or impairment in a watershed increases. The best candidate metrics for use in bioassessment are those that can differentiate between least-impaired and most-impaired streams. Using *a priori* sets of sites and samples representing least-impaired and most-impaired non-biological conditions (physical habitat and chemical water quality), we looked for metrics that best measured a difference in the biological communities corresponding to those two types of site conditions.

Using the same parameters as had been used to identify reference samples, we applied the following criteria to identify samples from the Virginia data whose physical and/or chemical quality could be considered stressed.

- Dissolved oxygen < 4.0 mg/L
- pH < 4.0
- Conductivity > 1000 umhos/cm
- Total habitat score < 120, and one or more of the following:
  - Epifaunal substrate score < 7
  - Channel alteration score < 7
  - Sediment deposition score < 7
  - Bank disruptive pressure score < 7
  - Riparian vegetation zone width score < 4

To be labeled as stressed, a sample needed to meet only one of the listed conditions. Using these criteria, 71 samples from 25 sites were identified as stressed.

Box-and-whisker plots were used to display distributions and ranges of values of the metrics between stream-quality categories (reference and stressed samples). This type of plot displays the statistics of median value, minimum value, maximum value, and 25th and 75th percentile values of a population of data. The text box illustrates how the statistical values are displayed by the box-and-whisker plots employed in this report.



Box Plots

The box shows the range from the 25th percentile to the 75th percentile of the values (the interquartile range, or IQR). Within the box, the median, or 50th percentile value, is displayed as a point. Whiskers show the range from the non-outlier minimum value (often 0) to non-outlier maximum value:

- the non-outlier minimum limit is equal to the 25th percentile value minus 1.5 times the interquartile range, and
- the non-outlier maximum limit is equal to the 75th percentile value plus 1.5 times the interquartile range.

The whiskers show the range of data values that are within these limits, though not necessarily the actual 1.5*x* limits themselves. *Extremes* are values that are either:

- greater than the 75th percentile value plus 3 times the interquartile range, or
- less than the 25th percentile value minus 3 times the IQR (Figure 3-9).

Outliers are values falling between the 1.5xIQR whisker thresholds and the 3xIOR *extremes*

The ability of a metric to discriminate between least-disturbed (reference) and most-disturbed (stressed) samples is based on the degree to which the metric boxplot in reference samples differs from the same metric's boxplot in stressed samples. For example, in Figure 4-13b (Chapter 4), the boxplots for the metric Percent Trichoptera overlap considerably. The interquartile range (IQR) of values in reference samples is completely within the IQR of values in stressed samples, and the medians of each range are not very different. The metric does not differentiate well between the two populations of samples. In contrast, the metric Total Taxa (Figure 4-11a) shows no overlap between the interquartile ranges of the reference and stressed

samples, and the median of either population of samples is well outside the IQR of the other population of samples. This metric differentiates more clearly between the reference and stressed populations of samples.

3.6 Index development

To obtain an overall measure of ecological integrity, multiple metrics were combined to provide a single multimetric index of biotic integrity. This index provides a single numeric assessment value that combines information from different types of biological information. In addition to selecting individual metrics that (1) can discriminate clearly between least-stressed and most-stressed conditions, metrics should (2) represent at least several different aspects of the biotic community (e.g., composition, richness, diversity, tolerance, trophic groups), and (3) minimize redundancy among individual component metrics. To test for redundancy, we performed a Pearson correlation analysis on metrics calculated from the Virginia data. Metrics that are highly correlated measure the same thing and should not be used together to determine impairment. The process of metric selection was iterative, with these areas of consideration being revisited and weighed through the process.

Once metrics were selected for use in a multimetric index, the metric values were converted to unitless scores, and then the individual metric scores were averaged into a single numerical index value. To score the metrics, the range of values for each metric was standardized to a consistent 100-point scale, assigning all metric values a proportional score ranging from 0 (worst) to 100 (best). The specific scoring procedure used for achieving the 100-point scoring range differed depending on whether an individual metric's values increased or decreased with greater environmental disturbance.

Scoring metrics that decrease with stress. For metrics such as Total Taxa or EPT Taxa that decrease in value with increasing site disturbance (i.e., higher values represent better site conditions), the 95th percentile of metric values in all samples was assigned a unitless "best" or "standard" score of 100. Choosing the 95th percentile value rather than the 100th percentile as the standard score reduced the effect of unusual outlier values that might otherwise skew the ultimate index. Values between the minimum ("worst," usually 0) and the 95th percentile values were scored proportionally from 0 to 100 according to Equation 1:

Equation 1:
$$score = \min\left(\left(\frac{\chi}{\chi_{95} - \chi_{\min}}\right), 1\right) \times 100$$

where,

x = the calculated metric value
x_{95} = the 95th percentile of this metric's values in all samples
$x_{\min}$ = the minimum possible value, usually 0.

Any value "better" than the 95th percentile is set to 100.

Scoring metrics that increase with stress. For metrics such as HBI or Percent Diptera that increase in value with increasing site disturbance (i.e., higher values represent worse site conditions), the 5th percentile of metric values in all samples was assigned a unitless best, or standard, score of 100. Again, choosing the 5th percentile value rather than the minimum value as the "best" score reduced the effect of unusual outlier values that might otherwise skew the ultimate index. For these metrics, values between the maximum (worst) value in the range and the 5th percentile value (standard, or best value) were scored proportionally from 0 to 100 according to Equation 2:

Equation 2:
$$score = \min\left(\left(\frac{\chi_{\max} - \chi}{\chi_{\max} - \chi_5}\right), 1\right) \times 100$$

where,

x = the calculated metric value
x_5 = the 5th percentile of this metric's values in all samples
x_{max} = the maximum possible value; e.g., 10 for HBI or 100% for percentage metrics.

Any value "better" than the 5th percentile is set to 100.

Combining scores into an index. By standardizing the metric values to a common 100-point scale, each of the metrics contributed to the combined index with equal weight, and all of the metric scores represented increasingly better site conditions as scores increased toward 100. Once all metric values for sites were converted to scores on the 100-point scale, a single multimetric site index score was calculated by simply averaging the individual unitless metric scores for the sample.

Table 3-1. Water quality and physical habitat data definitions and data descriptions in classification/development reference samples. Data values are reported in Appendix B.

CONDUCT	Specific conductance (uS/cm)
OXYGEN	Dissolved oxygen (mg/L)
PH	standard units
TEMP	Water temperature (degrees Celsius)
TOTHAB	Total habitat score (0-240 points)
ALTER	Channel alteration score (0-20 points)
BANKS	Bank stability (condition of banks) score (0-20 points)
BANKVEG	Bank vegetative protection score (0-20 points)
COVER	Instream cover for fish score (0-20 points)
EMBED	Embeddedness score (0-20 points)
FLOW	Channel flow status score (0-20 points)
GRAZE	Grazing or other bank disruptive pressure score (0-20 points)
RIFFLES	Frequency of riffles score (0-20 points)
RIPVEG	Riparian vegetation zone width (least buffered side) (0-20 points)
SEDIMENT	Sediment deposition score (0-20 points)
SUBSTRATE	Epifaunal substrate score (0-20 points)
VELOCITY	Velocity/depth regimes score (0-20 points)

Visual habitat parameter scoring:

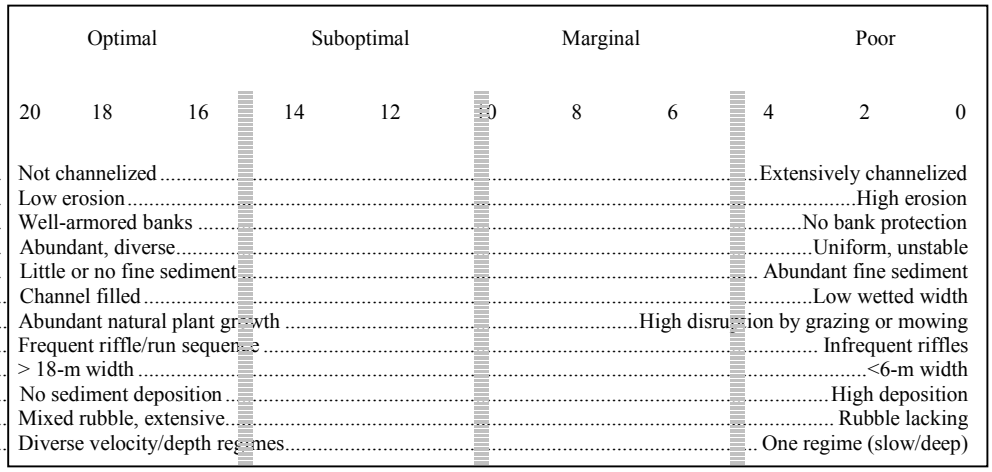


Table 3-2. Description of data in 62 Virginia non-coastal classification/development Reference sites (247 samples).

A. Number of Reference Sites and Samples by Ecoregion

	#45 Piedmont	#64 Northern Piedmont	#66 Blue Ridge	#67a & #67f Limestone valleys	#67 Ridge & Valley w/o Limestone Valleys	#69 Central Appalachians
# Sites	4	7	8	15	23	5
# Samples	22	48	22	64	82	9

B. Number of Reference Sites and Samples by DEQ Administrative Region

	1 Southwest	2 West Central	3 Valley	4 Northern	5 Piedmont
# Sites	23	10	19	9	1
# Samples	57	63	59	62	6

C. Number of Reference Samples by Month and Year Sampled

	1994	1995	1996	1997	1998	ALL
January				1		1
February						0
March		1		1	1	3
April	1	5	6	6	4	22
May		20	22	16	10	68
June			4	1	12	17
July		1			1	2
August				3		3
September	2	2		7	5	16
October	20	14	12	19	11	76
November	8	5	5	4	7	29
December	1	3		6		10
ALL	32	51	49	64	51	247

D. Number of Reference Sites and Samples by Stream Order

Order:	1	2	3	4
# Sites	3	11	25	23
# Samples	23	46	94	84

E. Number of Reference Sites and Samples by Alkalinity/Gradient

	High Alk, Low Grad	High Alk, High Grad	Low Alk, Low Grad	Low Alk, High Grad
# Sites	15	8	18	21
# Samples	52	26	79	90

Table 3-3. Candidate Benthic Metrics: Definitions and expected response to increasing environmental disturbance. The following table lists benthic macroinvertebrate metrics considered as candidate metrics for assessing water quality in Virginia. These metrics quantitatively characterize differing attributes of the macroinvertebrate community. Also reported in the table is each metric's expected response to increasing disturbance (Barbour et al. 1999; Stribling et al. 1998, Smith and Voshell 1997.

Metrics, grouped by Category (name and variable name)		**Expected response** + increase - decrease	**Definition**
Taxonomic Richness: *Counts of different taxa within selected taxonomic groups:*			
Total Taxa	(RTOTAL)	-	Number of distinct taxa in the entire sample; measures the overall variety of the macroinvertebrate assemblage
EPT Taxa	(REPT)	-	Sum of distinct taxa in the generally pollution-sensitive insect orders of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies)
EPT Taxa less Hydropsychidae	(REPTLH)	-	Sum of taxa in the insect orders Ephemeroptera, Plecoptera, and Trichoptera, not including the generally pollution-tolerant caddisfly family Hydropsychidae.
Ephemeroptera taxa	(REPHM)	-	Number of Ephemeroptera taxa (mayfly nymphs)
Plecoptera taxa	(RPLEC)	-	Number of Plecoptera taxa (stonefly naiads)
Trichoptera taxa	(RTRIC)	-	Number of Trichoptera taxa (caddisfly larvae)
Trichoptera taxa less Hydropsychidae	(RTRILH)	-	Number of Trichoptera taxa not including the pollution tolerant caddisfly family Hydropsychidae
Diptera taxa	(RDIP)	-	Number of Diptera taxa ("true" fly larvae and pupae)
Chironomidae taxa	(RCHIR)	-	Number of taxa in the family Chironomidae (midge larvae)
Composition: *Percent abundance (of individuals in the sample) of...*			
%EPT	(ZEPT)	-	... Ephemeroptera (mayfly nymphs), Plecoptera (stonefly naiads), and Trichoptera (caddisfly larvae)
%EPT less Hydropsychidae	(ZEPTLH)	-	... Ephemeroptera, Plecoptera, and Trichoptera not including pollution tolerant caddisflies in the family Hydropsychidae
% Ephemeroptera	(ZEPHM)	-	... mayfly nymphs
% Plecoptera	(ZPLEC)	-	... stonefly naiads
% Trichoptera	(ZTRIC)	-	... caddisfly larvae
% Trichoptera less Hydropsychidae	(ZTRILH)	-	... caddisfly larvae not including those in the pollution tolerant family Hydropsychidae
% Plecoptera plus Trichoptera less Hydropsychidae	(ZPTLH)	-	... stonefly naiads plus caddisfly larvae not including those in the pollution tolerant family Hydropsychidae
% Diptera	(ZDIP)	+	... "true" fly larvae and pupae
% Chironomidae	(ZCHIR)	+	... Chironomidae (midge) larvae and pupae
% Oligochaeta	(ZOLIG)	+	... aquatic worms

Table 3-3. (continued)

Metrics, grouped by Category (name and variable name)		Expected response + increase - decrease	Definition
Trophic groups: *Percent abundance of individuals in the sample, or number of taxa in the sample, whose primary functional mechanism for obtaining food (functional feeding group, FFG) is to...*			
% Collectors	(ZCOLL)	-	... collect/gather depositional organic matter
% Filterers	(ZFILT)	variable	... filter and collect suspended organic matter
% Predators	(ZPRED)	variable	... attack prey and ingest whole organisms or their parts
% Scrapers	(ZSCRA)	-	... graze on substrate- or periphyton-attached algae and associated material
% Shredders	(ZSHRED)	-	... shred and chew leaf litter and detritus
Scraper taxa	(SCRTAX)	-	(number of taxa classified primarily as scrapers)
Diversity: *Percent abundance in the sample of individuals belonging to...*			
% Dominant	(Z1DOM)	+	... the single most abundant taxon
% 2 Dominant taxa	(Z2DOM)	+	... the two most abundant taxa
% 5 Dominant taxa	(Z5DOM)	+	... the five most abundant taxa
Tolerance: *Counts, proportions, or weighted scores of taxa based on ability to survive exposure to stressors:*			
Intolerant taxa	(INTOLTX)	-	Number of taxa with Tolerance Values ≤3
% Tolerant	(ZTOL)	+	Percent abundance of organisms with a Tolerance Value ≥7
HBI	(HBI)	+	Abundance-weighted average tolerance of assemblage of organisms (Family taxonomic level)
Habit: *Organisms having the specified dominant behavior for moving and maintaining physical position in their habitat:*			
% Clingers	(ZCLNG)	variable	Percent abundance of insects having fixed retreats or adaptations for attachment to surfaces in flowing water
Clinger taxa	(CLNGTX)	variable	Number of taxa having fixed retreats or adaptations for attachment to surfaces in flowing water

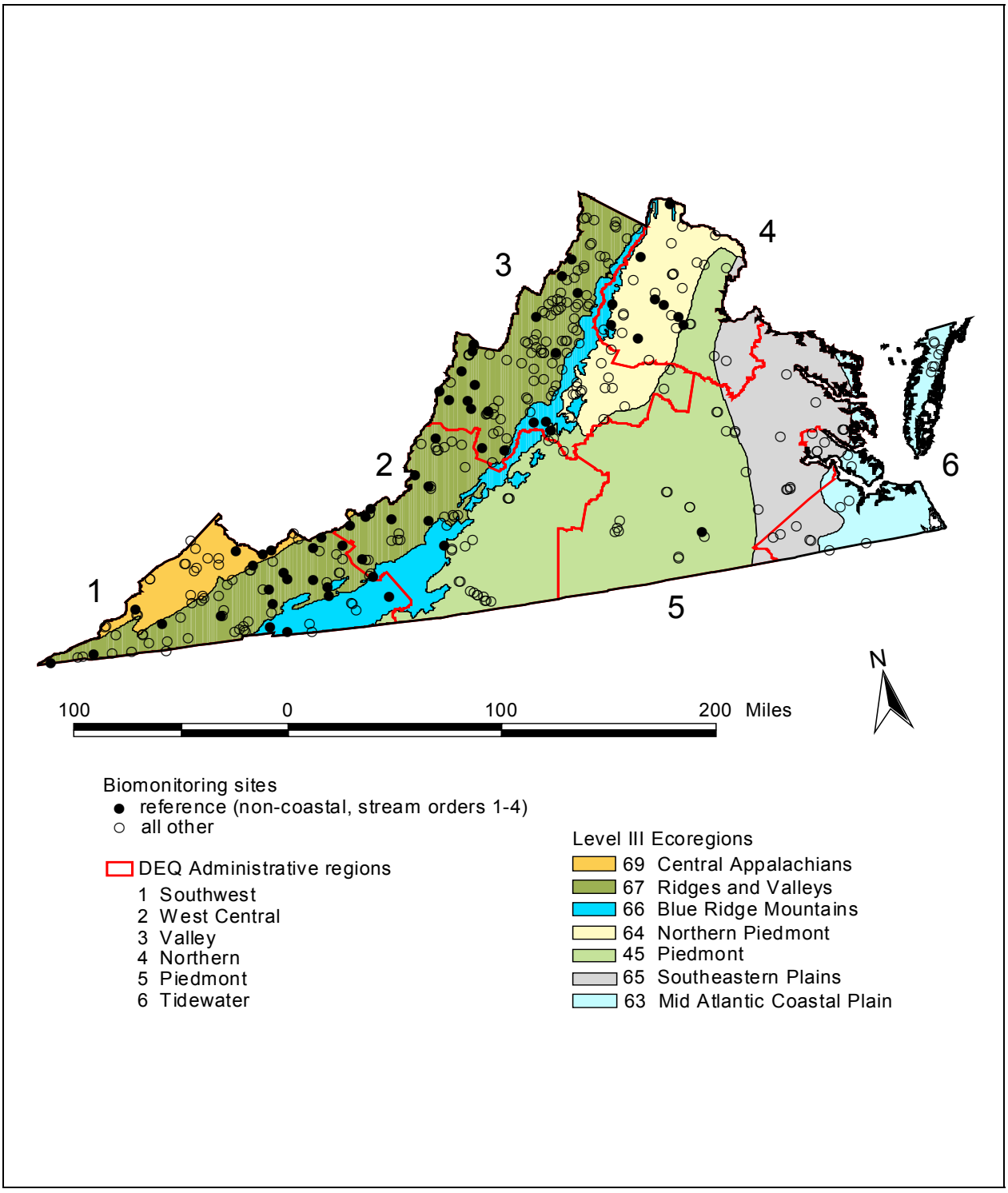
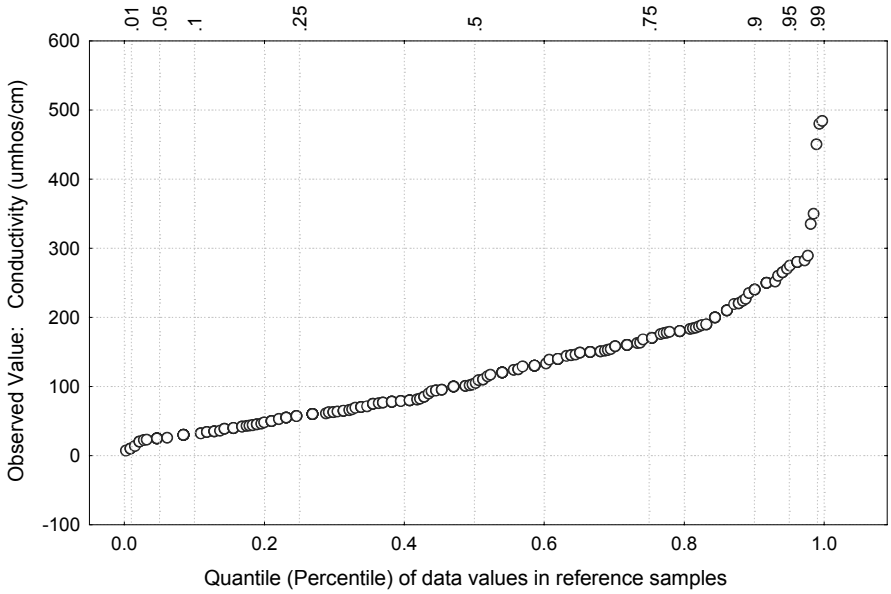


Figure 3-1. Virginia DEQ biomonitoring sites, administrative regions, and Level III Ecoregions



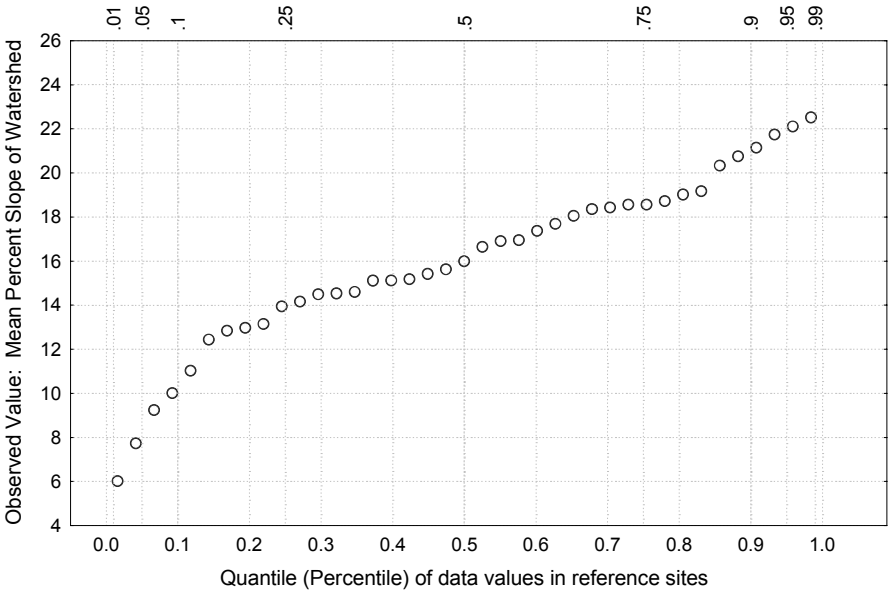


Figure 3-2. Values and distribution of data used for assigning reference sites to conductivity/gradient classes: (a) conductivity in reference samples (n=247); (b) average percent catchment slope in reference sites for which digital elevation data were available (n=39 of 62 reference sites). See text section 3.4.

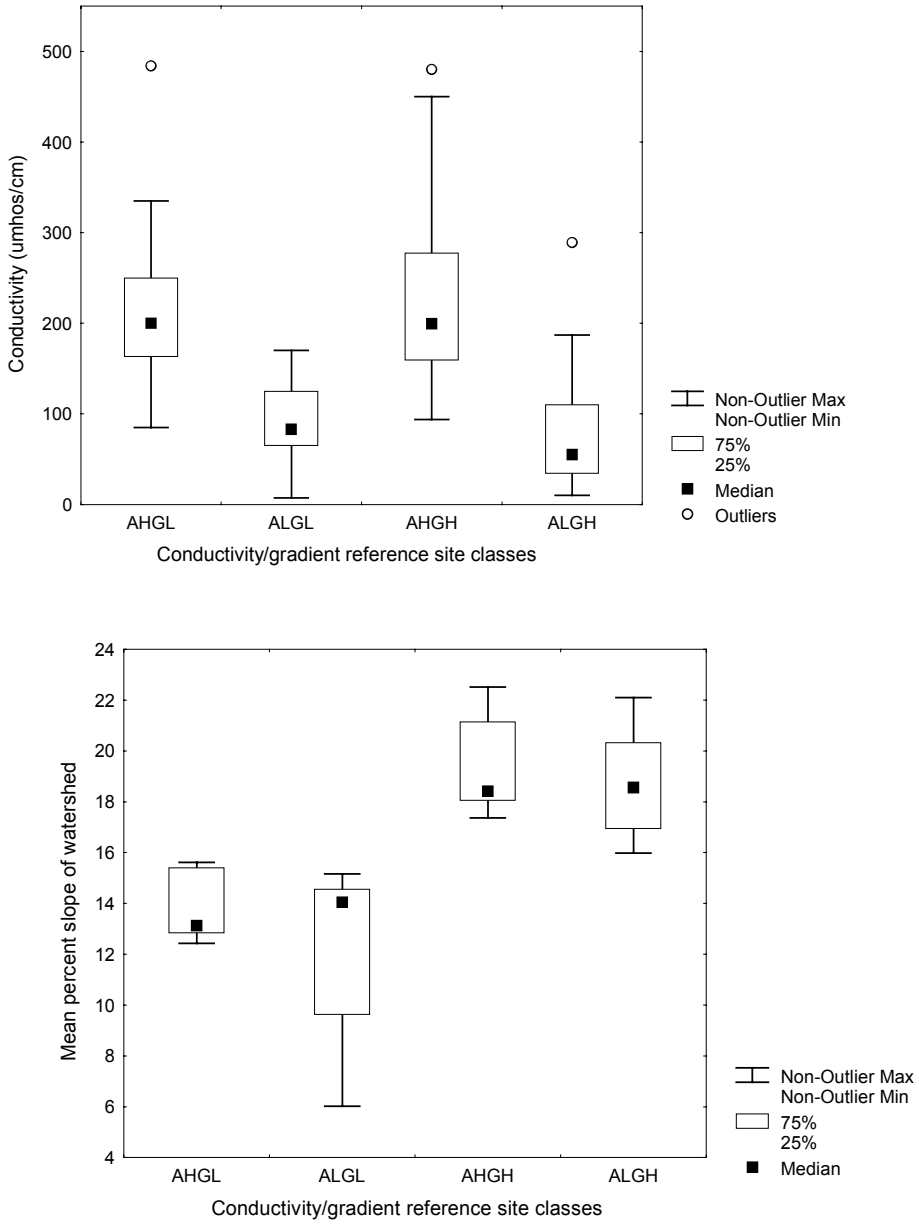


Figure 3-3. Values and distributions of data in reference sites assigned to four conductivity/gradient classes: (a) conductivity in multiple samples collected at reference sites; (b) average percent catchment slope in reference sites for which digital elevation data were available.

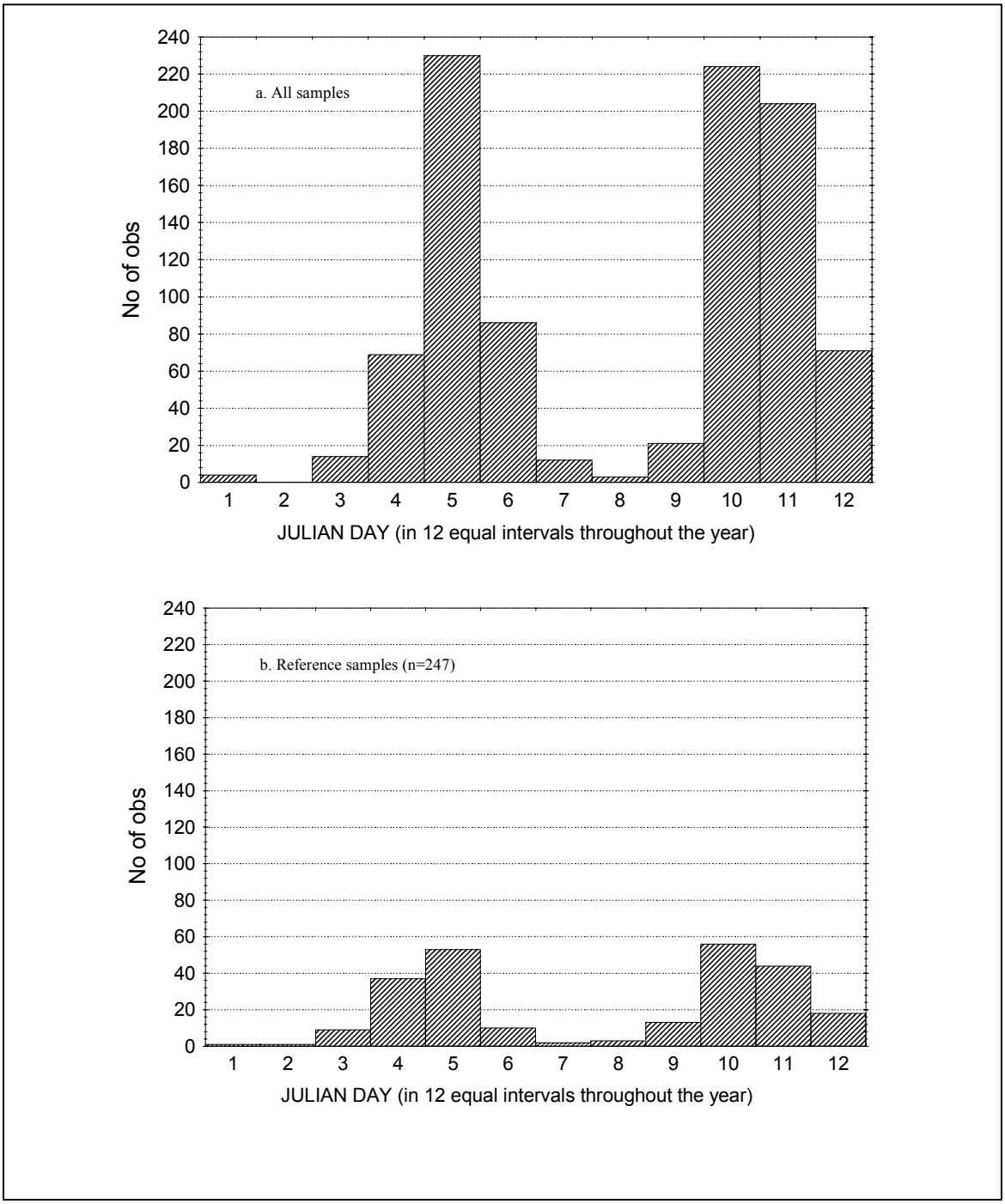


Figure 3-4. Number of observations in the database by Julian Day (a) in all samples, and (b) in classification/development reference samples. Sampling is clustered in broad periods in spring and fall.

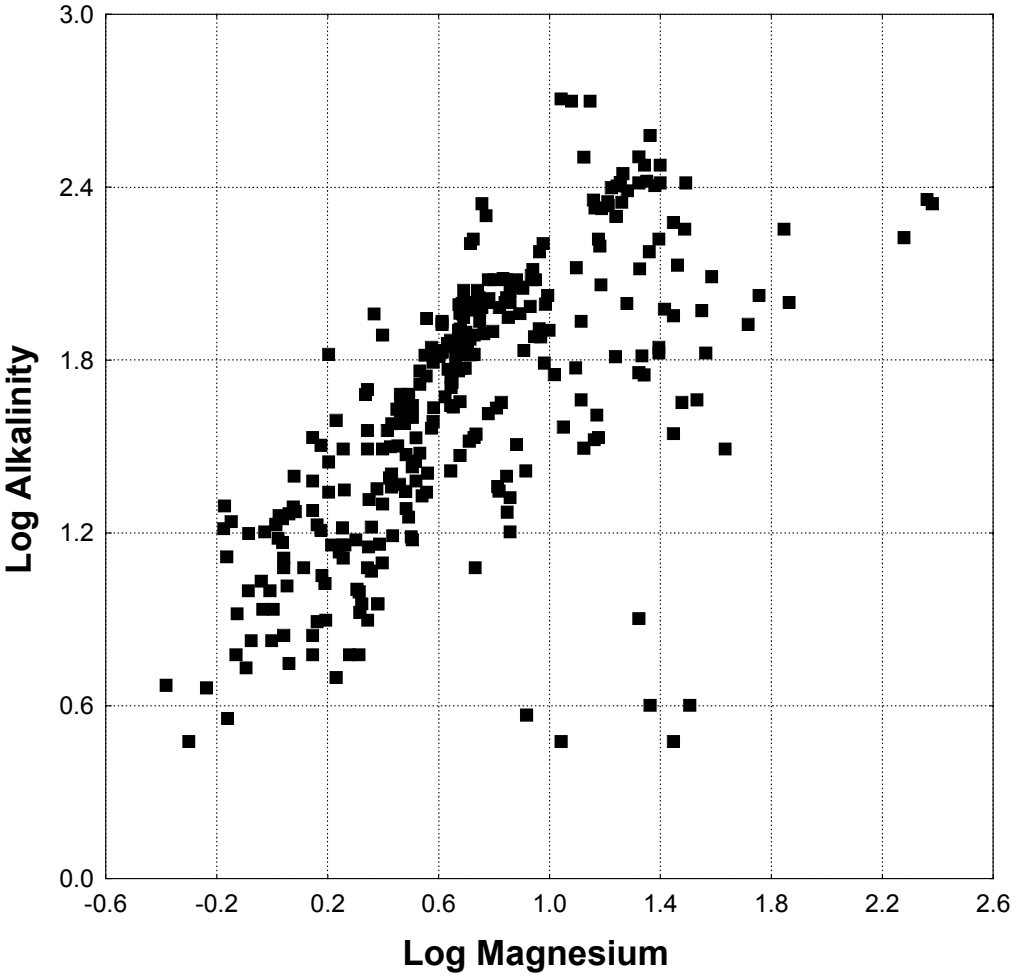


Figure 3-5. Two variable scatterplot: log alkalinity and log magnesium concentration (West Virginia DEP stream data).

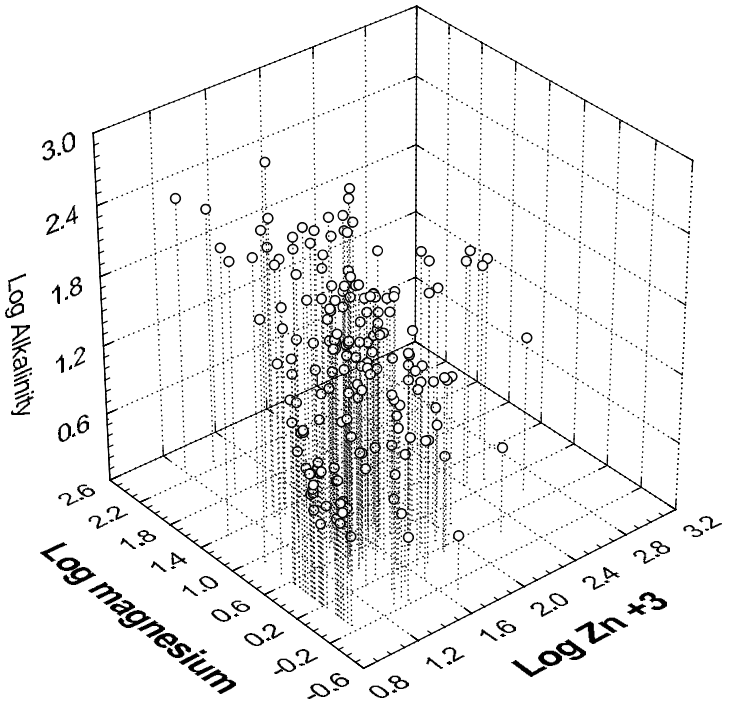


Figure 3-6. Scatter plot with three variables: log alkalinity, log magnesium and log zinc (Gerritsen et al. 2000 data).

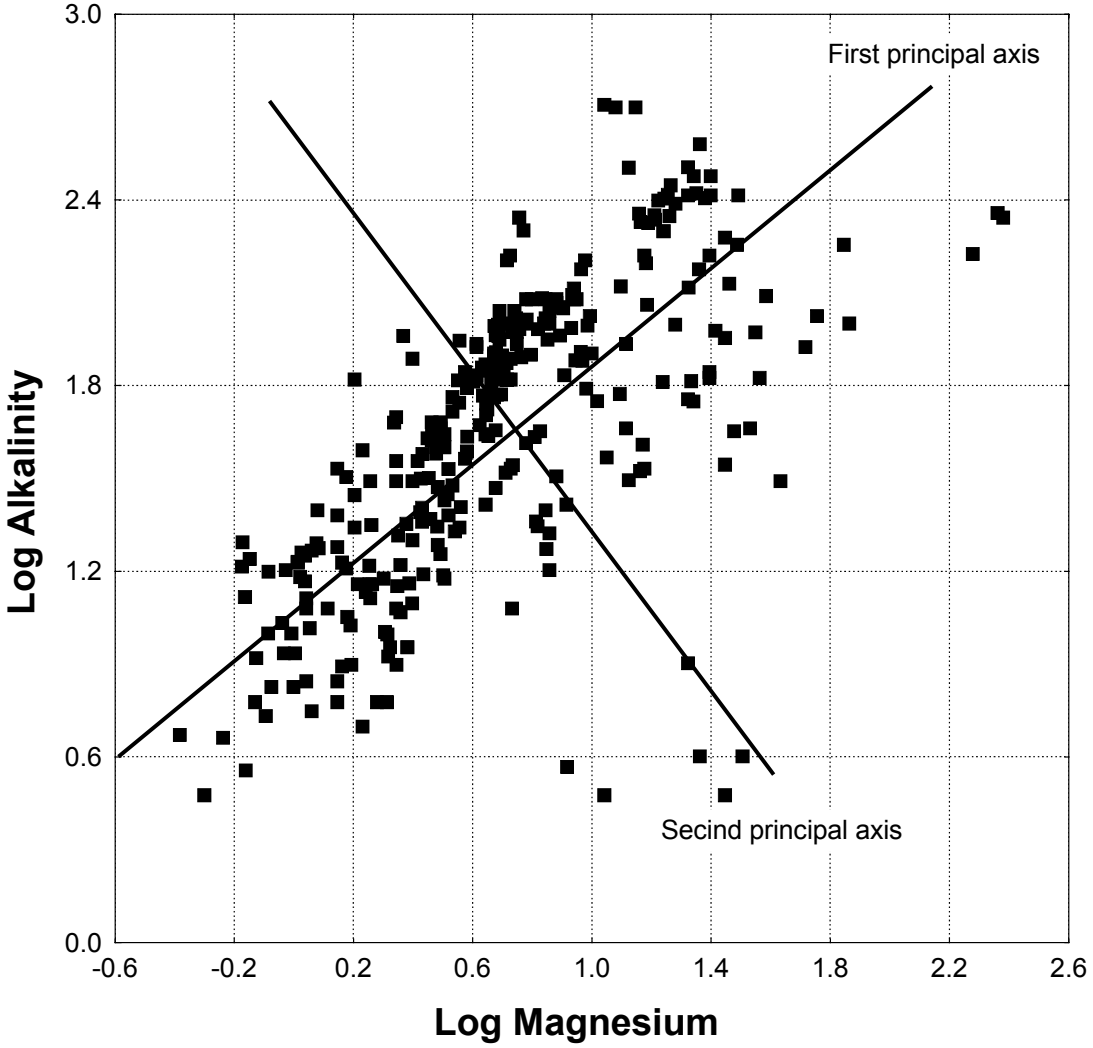


Figure 3-7. Log alkalinity and log magnesium (as in Figure 3-5) with rotated and translated principal axes.

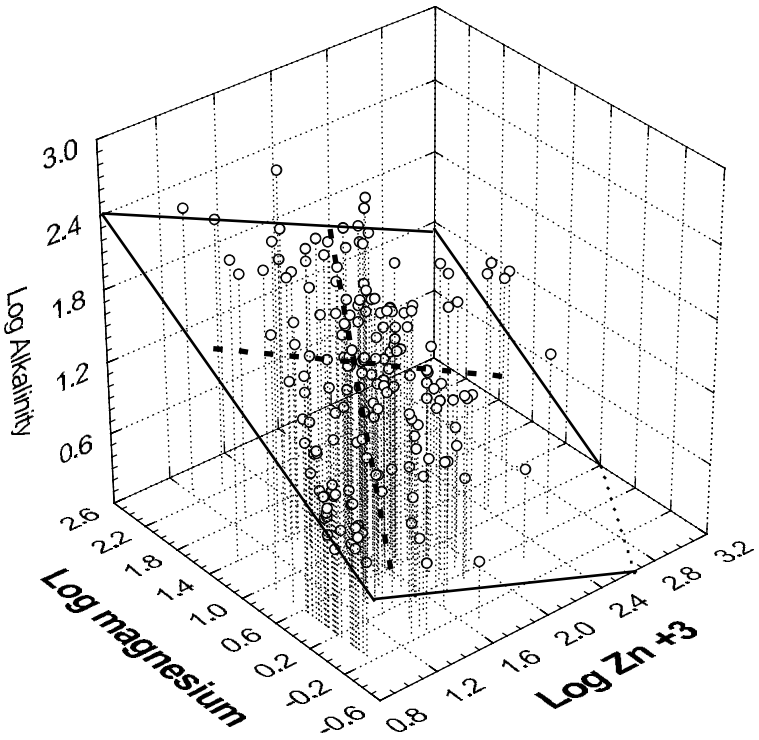


Figure 3-8. Ordination of three variables (as in Figure 3-6) to two: best-fit plane (solid lines) with two principal axes (heavy dashed lines).

4. Index Development

The objective of classification was to separate streams into distinct classes, so that separate reference expectations could be developed for each class. Non-biological information used to identify the classes was ecoregion (geographic or spatial classes), stream order, water chemistry (conductivity), and watershed gradient. Conductivity was used as a surrogate for alkalinity. Other physical and chemical measurements in the data set (Table 3-1) were deemed to be subject to alteration by human disturbance and therefore not suitable for classifying reference sites. Watershed gradient was determined from digital elevation models (Section 3.4).

Classification consisted of two steps: ordination of community composition and examination of metric values among the different classifications. This two-part process ensures that the final classification reflects both the basic structure of the invertebrate assemblage as well as the response measures used in index development.

Several factors may confound the classification. These include methodological artifacts and random errors:

- Index period – Virginia DEQ sampled in two index periods, spring and fall, which may be characterized by different taxa in the samples.

- Methods – DEQ regions used slightly different sampling methods, possibly resulting in an artificial classification showing DEQ regions instead of natural differences among sites.

- Reference site selection method – we augmented the reference site sample by defining reference criteria and adding sites that met the criteria to the reference set (Section 3.3).

- Taxonomic Level – organisms were identified to the family level. Because families have much broader distribution than their component genera and species, the classification resolution (fineness) is dependent on the taxonomic resolution. Family-level identification will tend to reduce the confounding effects of index period and reference site selection, but real classes may be obscured.

- Sample size (random effects) – the reference sample consists of 62 sites with one to ten index period observations at each site. Some ecoregions are represented by only four or five sites, so application to whole ecoregions should be done with caution.

4.1 Confounding factors

Ordination of index periods showed a high degree of similarity between Spring and Fall sampling dates (Figure 4-1). Classification into separate index periods does not appear to be necessary from this analysis. Ordination of reference samples by type of site selection method (Section 3.3) also shows much similarity between the two initial selections (Figure 4-2), although the sites identified by both selection methods are somewhat more closely grouped together than the other two groups (on the left of Figure 4-2). The samples that met both sets of criteria qualify as the "best" reference sites. That they grouped more closely underscores the importance of careful definition of minimally stressed reference sites. Ordination of reference samples by VDEQ administrative region showed a weak segregation of samples (Figure 4-3). For example, samples from the Northern Regional Office are clustered loosely in the upper left side of the figure. The cluster patterns are not strong, but they do emphasize the need to improve consistency and standardization of methods among different administrative regions. Because both ecoregions and VDEQ administrative regions partition the state into similar areas (see Section 4.2), it is not possible to separate potential sampling artifacts from natural geographic variation. Sampling artifacts can be eliminated only when confidence is high that field and laboratory methods are identical throughout Virginia.

4.2 Ordinations

Stream Order. Although samples in this dataset are biased toward larger streams (third and fourth order streams, Table 3-2), NMS ordinations by stream order did not indicate appreciable differences in biota (Figure 4-4).

Ecoregions. NMS ordinations suggested segregation of samples from ecoregion 64, Northern Piedmont, and a lesser degree of segregation of samples from ecoregion 69, Central Appalachians (Figure 4-5). Samples from other ecoregion classes are fairly well mixed in the figure, indicating a high degree of similarity in the benthic communities among the Piedmont (#45), Blue Ridge (#66), and Ridge and Valley (#67) ecoregions, including the separately classed Limestone Valleys subregions (67a,f) of the Ridge and Valley ecoregion. As noted above (Section 4.1), these results are not easily distinguishable from methodological differences among DEQ administrative regions.

Physical-chemical. When samples were alternatively classed according to conductivity and gradient (Section 3.4), ordination showed a weak clustering of samples (Figure 4-6). Samples from the low conductivity/high gradient class (ALGH) were plotted mostly in the lower half of the figure, but the other three classes were found throughout the plot.

4.3 Metric values among classification groupings

Several candidate metrics were plotted in reference samples only, classified according to the ecoregion and conductivity/gradient classification groups previously presented in ordination graphs. These boxplots of classification groupings are presented in Figures 4-7 through 4-10. As with the ordinations, distinctions between classes in either the ecoregional or conductivity/ gradient classification scheme were weak. In the ecoregional groupings (Figure 4-7, 4-8), Central Appalachian sites had slightly, but consistently, poorer values for many metrics.

4.4 Virginia stream classes

Ordination analysis showed moderate separation of Northern Piedmont and Central Appalachian samples from the other sample sets (Figure 4-5). Classification based on conductivity and watershed gradient was weak, with only low conductivity-high gradient sites showing a slight shift from the other samples (Figure 4-6).

The ordination analysis thus suggests three classes for Virginia streams:

- Central Appalachians (ecoregion 69)
- Ridge and Valley, Blue Ridge and Piedmont (ecoregions 67, 66, 45)
- Northern Piedmont (ecoregion 64)

There are two confounding factors in this proposed classification:

- Sample size – The points in Figures 4-1 through 4-6 represent multiple samples from a small number of sites. There were seven Northern Piedmont sites and five Central Appalachian sites, a small number from which to infer characteristics of an entire region.

- Site selection – reference sites were originally selected by DEQ biologists. To increase the sample size, we selected additional samples meeting good habitat and water quality criteria. Most of the samples in the Northern Piedmont met both sets of selection criteria: the Northern Piedmont samples thus may represent the best reference conditions in the data set, but may not reflect natural differences among the ecoregions.

Many investigators across the mid-Atlantic region have considered whether limestone valley subecoregion streams form a distinct bioregion from the highland subecoregions and shale substrate valley subecoregions of the Ridge and Valley (e.g., Smith and Voshell 1997, Stribling et al. 1998, Gerritsen et al. 2000, Waite et al. 2000). In this project, we did not see a significant segregation of limestone valley subecoregions from other ecoregions (Figure 4-5), but we did observe some separation of high gradient, low conductivity streams from the other three classes (Figure 4-6). When considering metric values (Figures 4-9, 4-10), no distinction among conductivity/gradient classes could be detected.

These findings are compatible with other studies in the region. The Maryland Biological Stream Survey, after having seen indications of possible distinction between Inner and Outer Coastal Plain, Piedmont, Shale Ridges, and Limestone Valleys, concluded that there was insufficient data to warrant subdividing bioregions into so many classes (Stribling et al. 1998). Instead, Maryland streams were divided into two bioregions of Coastal Plain and Non Coastal Plain. A multi-state mid-Atlantic highlands study (Smith and Voshell 1997) using data from ecoregions 66, 67, 69, and 70 from Pennsylvania, Maryland, Virginia, and West Virginia found some indication of clustering of subregion 67a (limestone and dolomite valleys) separating it from other subecoregions in the Ridges and Valleys. Again, however, low sample size, combined with considerable overlap among potential bioregion groupings (weak segregation) led to the conclusion that the benthic macroinvertebrate communities could not be differentiated from one another with family-level data on the basis of ecoregions or subecoregions. However, individual metrics and multimetric indexes tended to distinguish reference from impaired streams better within individual ecoregions than in the aggregated data set. An analysis similar to the one in this report using West Virginia Division of Environmental Protection data also did not indicate distinct enough segregation of reference biological data by ecoregions to warrant assigning separate bioregions for assessments (Gerritsen et al. 2000). Finally, analysis of EPA's EMAP data collected in four Appalachian states (Pennsylvania, Maryland, West Virginia, Virginia; Waite et al. 2000) showed that valley streams and high conductivity streams were highly variable as a group, and accordingly did not form an identifiable cluster. The best *a priori* classification reported by Waite et al. (2000) was by stream order. We did not find stream order to be a strong classification; however, first order streams were severely underrepresented in the Virginia data set (Table 3-2). Appendix E provides a summary of several studies related to biomonitoring in Virginia or in ecoregions found across Virginia, comparing methods and best candidate metrics for assessment.

Values of metrics differed somewhat among ecoregions, but there were not substantial and consistent differences (Figures 4-7, 4-8). We conclude that although there is evidence of ecoregional differences in invertebrate families of Virginia streams, we cannot recommend a regional classification at this time because the samples may not be sufficiently representative of the ecoregions. We, therefore, propose a single index and index threshold to be applied to all non-Coastal Plain streams, until enough new data have been acquired to revisit the classification issue.

4.5 Metric discrimination ability

With only relatively weak patterns of classification indicated by ordinations, the ability of metrics to discriminate between *a priori* reference and stressed samples was first examined without separating the samples into bioregion classes. We did not examine responses to individual stressors, but previous work with Long (2001) showed that Virginia benthic communities are affected by individual water quality and habitat stressors. Metric boxplots reported in Figures 4-11 through 4-15 show discrimination ability ranging from poor to very

good. The poorest discrimination was shown by the metrics Percent Filterers, Percent Trichoptera, and Diptera Taxa, and these metrics were not examined further. The numbers of Plecoptera Taxa (families) were considered too low to be useful. Selected remaining metrics were analyzed with a Pearson Product-moment correlation to identify pairs of redundant metrics (Table 4-1). Twenty of the metrics included in Table 4-1 (Figures 4-11 through 4-15) have discrimination efficiencies of 75% or greater (no overlap of the reference and stressed sample IQR boxes).

4.6 Metric selection for index development

An iterative process of evaluating metric discrimination ability, community attribute categories (e.g., composition, tolerance, feeding groups), and redundancy led to selection of six (6) initial core metrics to be used in a multimetric index. Attention was given to selecting metrics appropriate for these Virginia data that also were consistent with metrics previously demonstrated to be useful in other states of EPA Region 3 (Appendix E). These six metrics were:

- Total Taxa
- EPT Taxa
- Percent Ephemeroptera
- Percent Plecoptera plus Trichoptera less Hydropsychidae
- Percent Chironomidae
- Percent Top 2 Dominant Taxa.

A multimetric index composed of these six metrics, as described in Section 3.6, discriminated well between the reference and stressed samples (Figure 4-16). Other highly discriminatory metrics were added incrementally as follows:

- Of the trophic metrics, Percent Scrapers and Scraper Taxa were best able to differentiate between reference and stressed samples (Figure 4-14e, f). When each was added separately to the initial six metrics, the Percent Scrapers metric was better able to improve the discrimination ability of the index.

- Of the tolerance metrics, Intolerant Taxa discriminated well between reference and stressed samples (Figure 4-15e) but was highly redundant with several other metrics (Table 4-1) so was eliminated. Percent Tolerant and HBI metrics both discriminated well (Figures 4-15d, 4-15f), and when each was added separately to the initial six metrics, HBI provided a slightly better improvement in the index's discrimination ability.

Two metrics, Percent Scrapers and HBI, were added to the initial six metrics resulting in eight (8) recommended metrics to be used in a Virginia multimetric non-coastal stream bioassessment index (Figure 4-17). Adding additional metrics to these eight did not significantly improve the ability of the index to differentiate between reference and stressed samples. Table 4-2 presents metric standard values and standardization equations for scoring the eight metrics recommended for use in this Virginia non-coastal benthic multimetric index.

Core Metrics

- EPT taxa
- Total taxa
- % Ephemeroptera
- % Plecoptera plus Trichoptera less Hydropsychidae
- % Chironomidae
- % Top 2 Dominant Taxa
- HBI (Family biotic index)
- % Scrapers

See definitions in Table 3-3.

The resultant Stream Condition Index (SCI) is similar to several other indexes developed for parts of t he state (e.g., Smock and Garman 1997; Shenandoah Basin; Jones and Kelso 1997 and Kelso et al. 2001; Northern Virginia Piedmont; Smith and Voshell 1997; several regional indexes). Because the SCI is calibrated to regional reference conditions, we did not use metrics requiring comparison among individual sites (e.g., Community Loss Index, Courtemanch and Davies 1987).

Table 4-1. Pearson Product-Moment correlation matrix among metrics calculated from Virginia DEQ biomonitoring data (n=938 samples over a 5-year period of record). Correlations greater than 0.80, and corresponding metric names, are shown in ***bold italic***. Blank cells indicate correlations that were not significant at $p<0.05$.

Total Taxa																								
0.79	***EPT Taxa***																							
0.78	***1.00***	***EPT Taxa less Hydropsychidae***																						
0.66	***0.81***	***0.81***	***Ephemeroptera Taxa***																					
0.68	***0.82***	***0.80***	0.46	***Trichoptera Taxa***																				
0.65	0.79	0.79	0.42	***0.97***	***Trichoptera Taxa less Hydropsychidae***																			
0.31	0.56	0.53	0.49	0.44	0.35	**% EPT**																		
0.52	0.74	0.73	0.65	0.52	0.49	0.73	***% EPT less Hydropsychidae***																	
0.40	0.56	0.56	0.64	0.32	0.28	0.66	***0.89***	***% Ephemeroptera***																
-0.08				0.17	0.09	0.57	-0.09	-0.18	**% Trichoptera**															
0.39	0.48	0.48	0.26	0.62	0.62	0.35	0.45	0.14	0.29	**% Trichoptera less Hydropsychidae**														
0.44	0.63	0.64	0.33	0.58	0.58	0.47	0.66	0.24	0.09	0.72	**% Plecoptera + Trichoptera less Hydropsychidae**													
-0.36	-0.37	-0.34	-0.32	-0.34	-0.27	-0.66	-0.48	-0.43	-0.40	-0.26	-0.31	***% Diptera***												
-0.40	-0.39	-0.36	-0.34	-0.36	-0.28	-0.62	-0.46	-0.41	-0.35	-0.25	-0.30	***0.88***	***% Chironomidae***											
-0.42	-0.41	-0.38	-0.33	-0.40	-0.31	-0.68	-0.47	-0.39	-0.44	-0.29	-0.35	0.70	0.79	**% Collectors**										
0.37	0.19	0.19	0.11	0.10	0.09	0.14	0.29	0.18	-0.16		0.31	-0.28	-0.25	-0.33	**% Predators**									
0.39	0.36	0.38	0.34	0.35	0.33	0.12	0.24	0.29	-0.14	0.18	0.15	-0.39	-0.37	-0.45		**% Scrapers**								
0.18	0.27	0.28	0.10	0.19	0.21	0.12	0.27		-0.13	0.14	0.55			-0.07	0.15		**% Shredders**							
0.70	0.59	0.58	0.50	0.58	0.55	0.27	0.37	0.30		0.33	0.32	-0.37	-0.38	-0.41		0.58		**Scraper Taxa**						
-0.68	-0.57	-0.57	-0.51	-0.44	-0.42	-0.16	-0.50	-0.39	0.29	-0.32	-0.42	0.25	0.29	0.29	-0.42	-0.37	-0.25	-0.45	***% Dominant***					
-0.77	-0.64	-0.64	-0.56	-0.50	-0.48	-0.21	-0.52	-0.40	0.24	-0.34	-0.46	0.30	0.34	0.34	-0.48	-0.39	-0.27	-0.51	***0.93***	***% Top 2 Dominant***				
-0.86	-0.69	-0.69	-0.58	-0.56	-0.54	-0.22	-0.50	-0.35	0.20	-0.36	-0.48	0.30	0.32	0.33	-0.50	-0.36	-0.29	-0.57	0.79	***0.90***	***% Top 5 Dominant***			
0.78	***0.88***	***0.88***	0.58	0.74	0.73	0.48	0.69	0.47		0.47	0.68	-0.33	-0.36	-0.42	0.38	0.31	0.38	0.50	-0.57	-0.65	-0.72	***Intolerant Taxa***		
-0.37	-0.52	-0.49	-0.50	-0.39	-0.30	-0.63	-0.52	-0.46	-0.30	-0.24	-0.33	0.21	0.27	0.55	-0.15	-0.29	-0.13	-0.36	0.28	0.31	0.30	-0.45	**%Tolerant**	
-0.58	-0.75	-0.74	-0.62	-0.58	-0.52	-0.69	***-0.85***	-0.69		-0.44	-0.67	0.47	0.49	0.63	-0.35	-0.45	-0.34	-0.49	0.54	0.58	0.57	-0.74	0.78	***HBI***

Table 4-2. Metrics for recommended Draft Virginia non-coastal benthic multimetric index: Standard values and standardization equations.

Metrics that decrease with stress	Standard (best value) X_{95}	X_{min}	Standardization equation (Section 3.6, Equation 1; X=metric value)
Total taxa	22	0	score = 100 × (X/22)
EPT taxa	11	0	score = 100 × (X/11)
% Ephemeroptera	58.9	0	score = 100 × (X/58.9)
% Plec+Tric less Hydropsych.	34.8	0	score = 100 × (X/34.8)
% Scrapers	49.1	0	score = 100 × (X/49.1)
Metrics that increase with stress	**Standard (best value) X_5**	**X_{max}**	**Standardization equation (Section 3.6, Equation 2; X=metric value)**
% Chironomidae	0	100	score = 100 × [(100-X)/(100-0)]
% Top 2 Dominant	29.5	100	score = 100 × [(100-X)/(100-29.5)]
HBI (family)	3.2	10	score = 100 × [(10-X)/(10-3.2)]
Final index score for a site is determined by averaging the site's 8 unitless standardized metric scores, using a maximum metric score of 100 for any metric whose individual score at a site exceeded 100.			

Note: Figure 4-1 to 4-6. Ordination by NMS of benthic reference samples, showing symbols for alternative *a priori* classification.

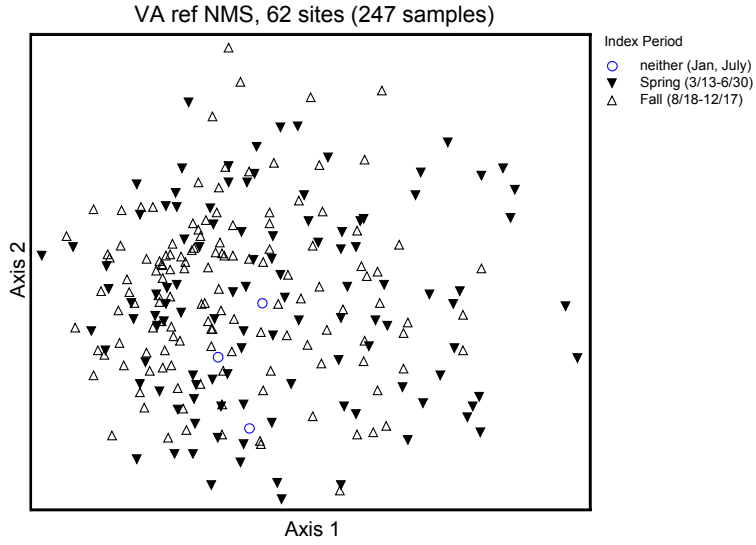


Figure 4-1. Index period.

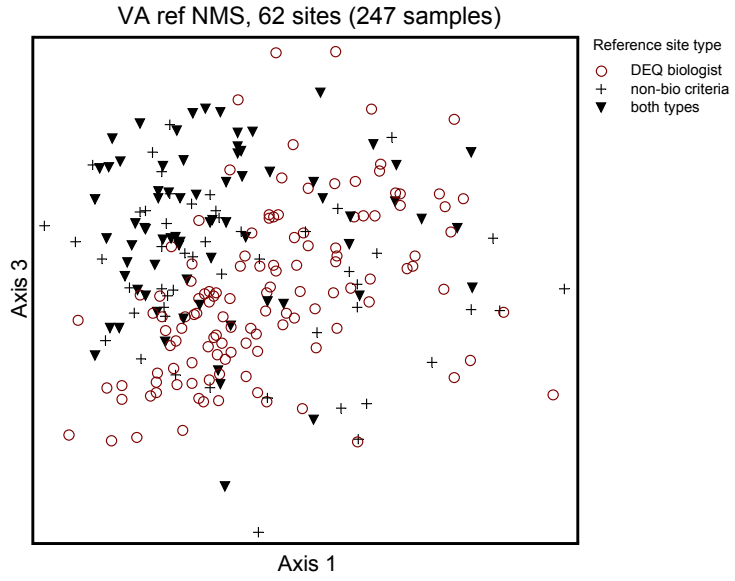


Figure 4-2. As in Figure 4-1, identifying benthic reference method of site selection.

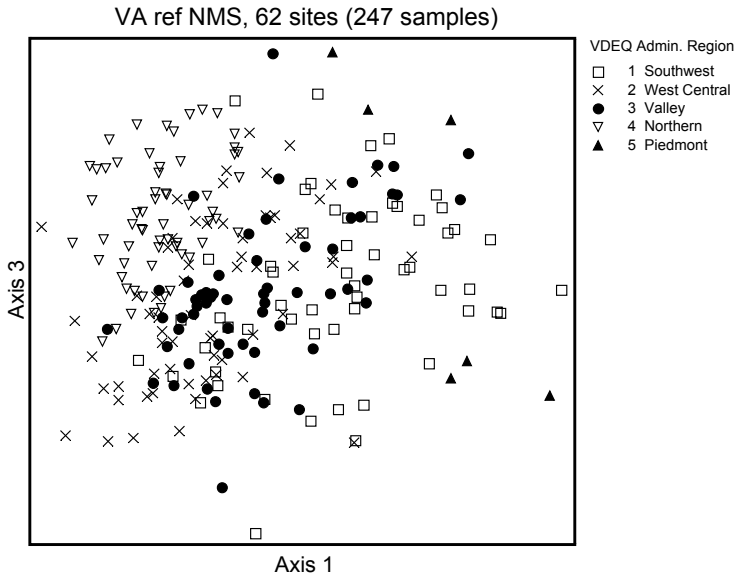


Figure 4-3. As in Figure 4-1, identifying DEQ administrative region.

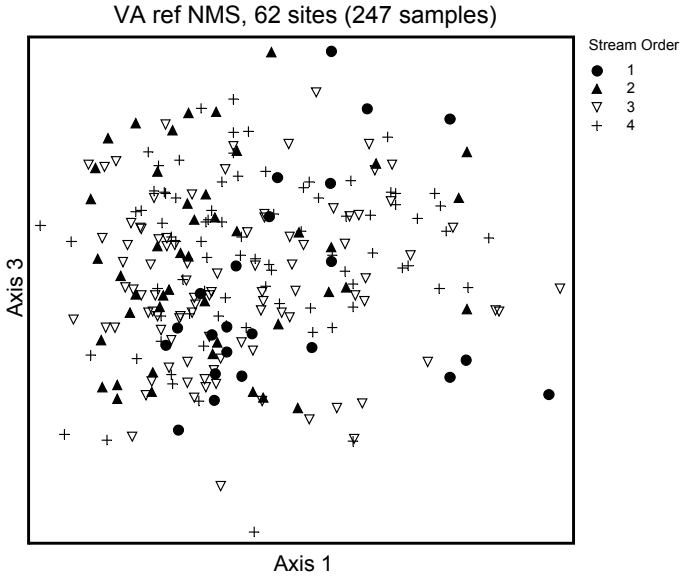


Figure 4-4. As in Figure 4-1, identifying stream order.

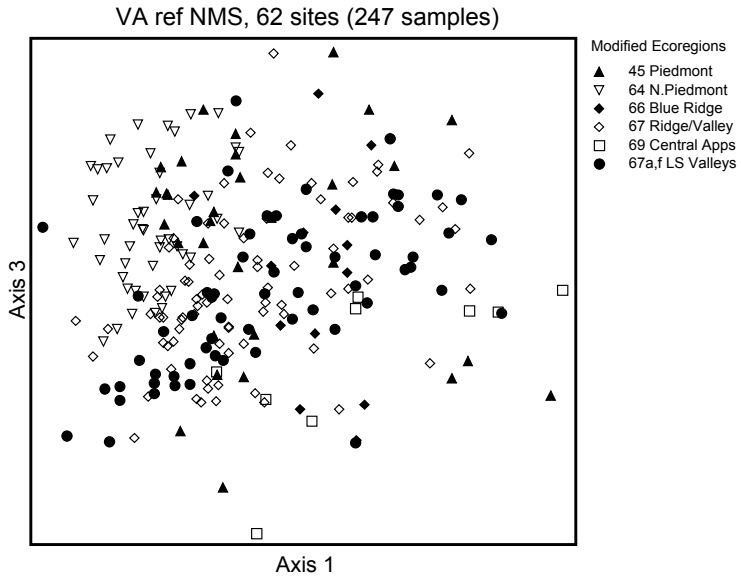


Figure 4-5. As in Figure 4-1, identifying benthic reference samples by modified ecoregion classes.

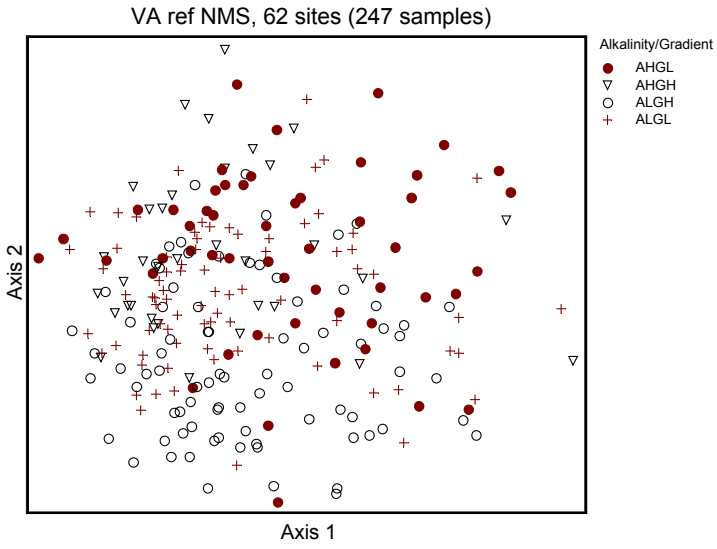


Figure 4-6. As in Figure 4-1, identifying classes of high and low conductivity and gradient (A=conductivity, G=gradient, H=high, L=low.

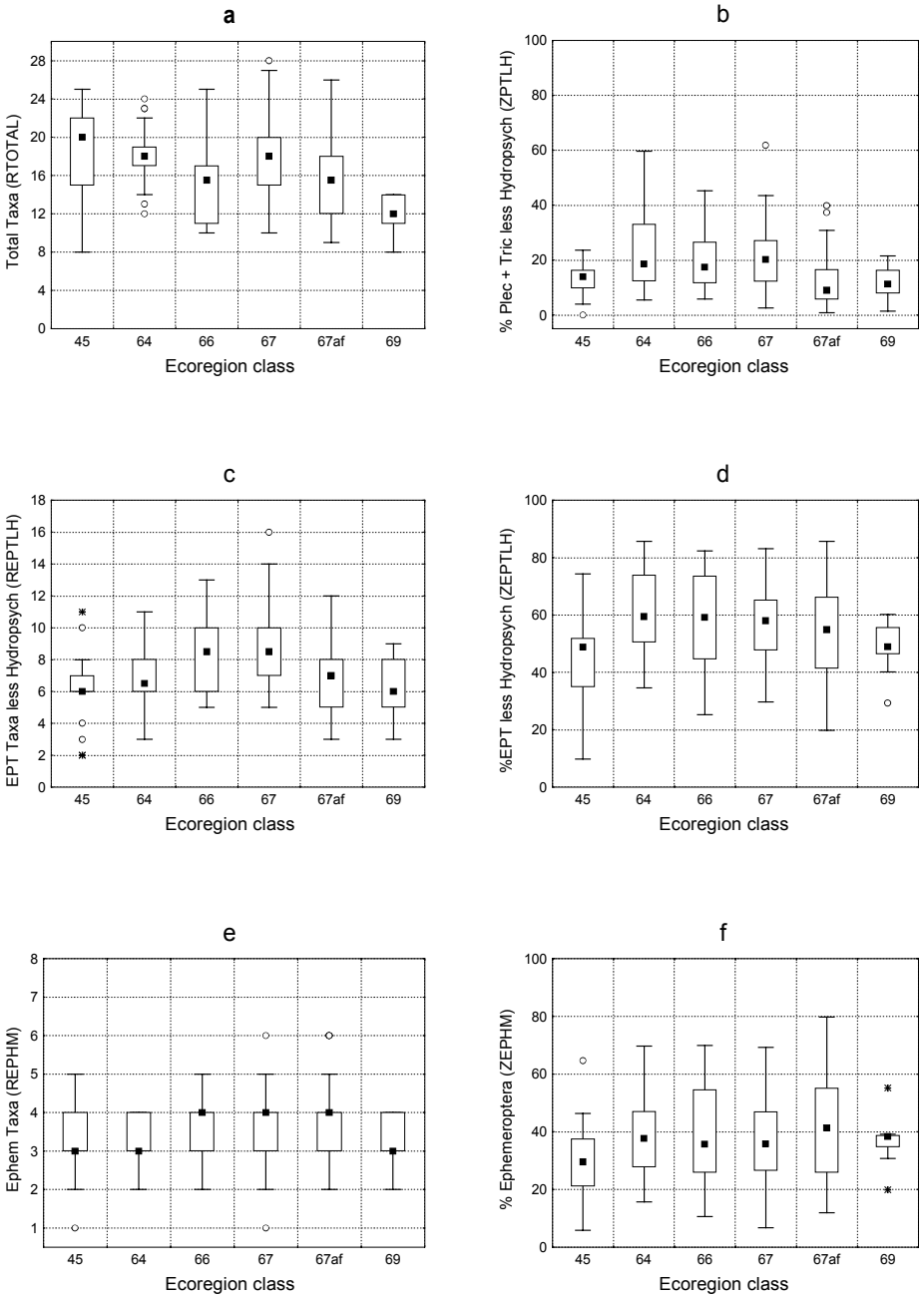


Figure 4-7. Selected benthic metric boxplots in reference samples by ecoregion classes (1) a = Total taxa; b = % Plecoptera and Trichoptera less Hydropsychidae; c = EPT taxa less Hydropsychidae; d = % EPT less Hydropsychidae; e = Ephemeroptera taxa; f = % Ephemeroptera.

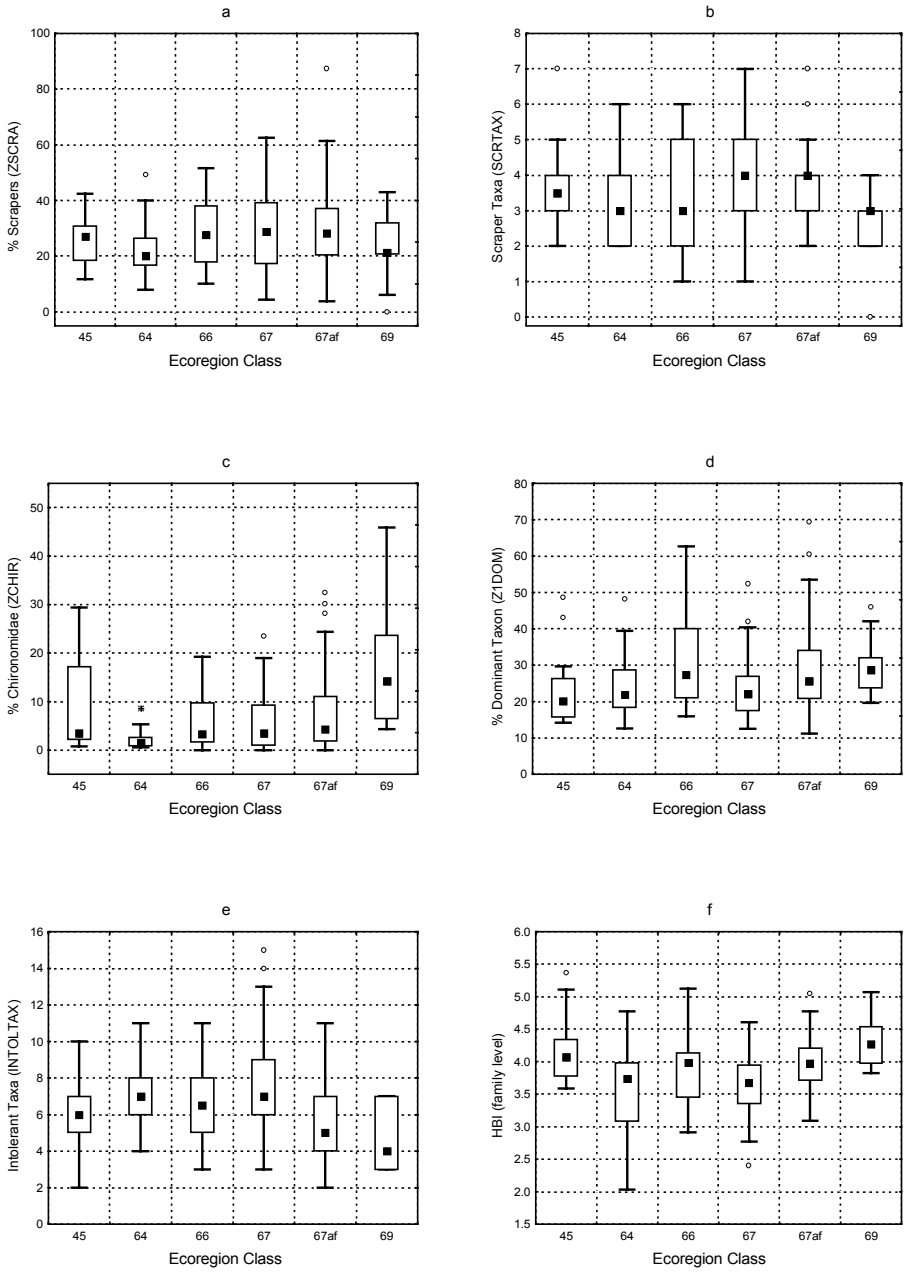


Figure 4-8. Selected benthic metric boxplots in reference samples by ecoregion classes (2) a = % Scrapers; b = Scraper taxa; c = % Chironomidae; d = % Dominant taxon; e = Intolerant taxa; f = Hilsenhoff family index.

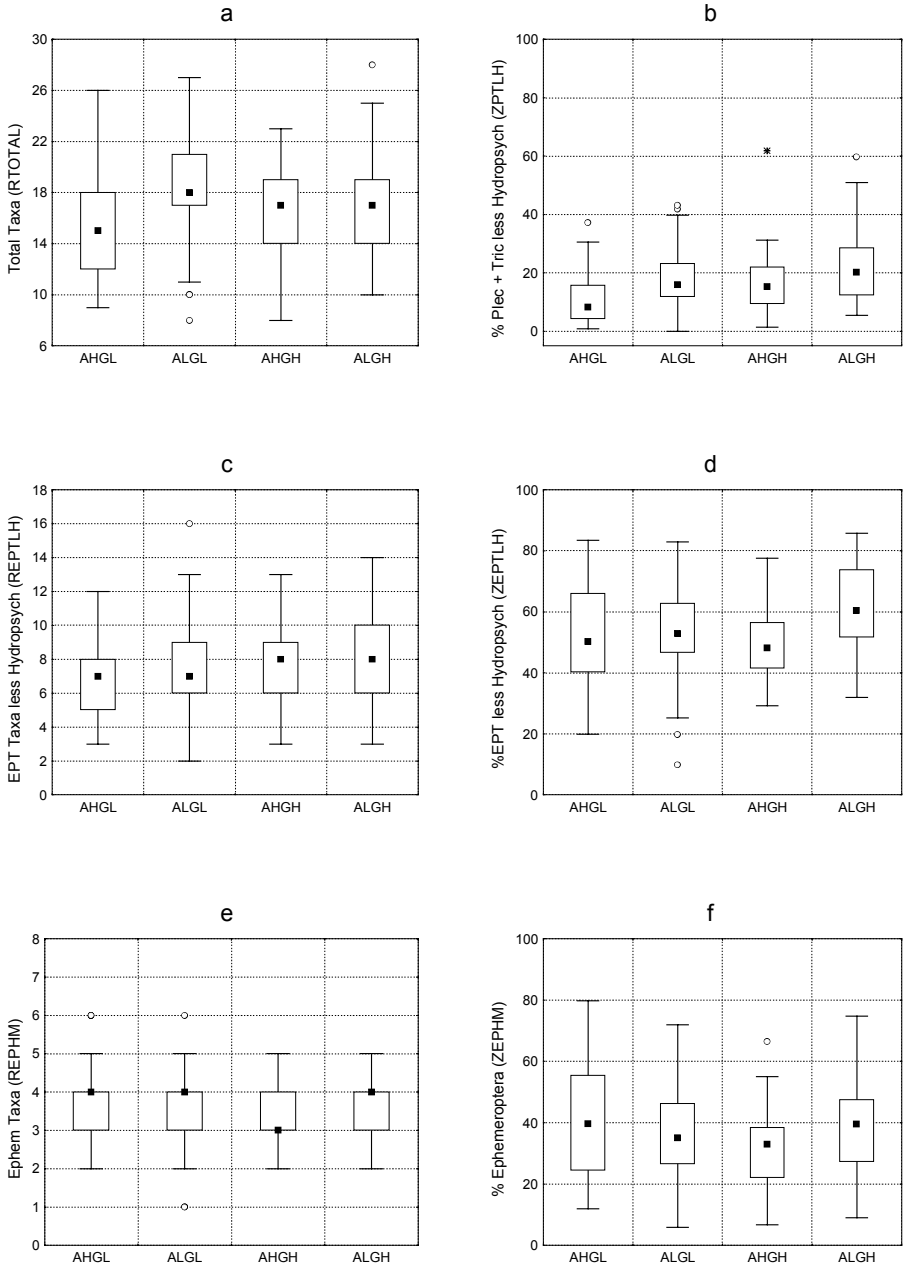


Figure 4-9. Selected benthic metric boxplots in reference samples by conductivity/gradient classes (1) a = Total taxa; b = % Plecoptera and Trichoptera less Hydropsychidae; c = EPT taxa less Hydropsychidae; d = % EPT less Hydropsychidae; e = Ephemeroptera taxa; f = % Ephemeroptera.

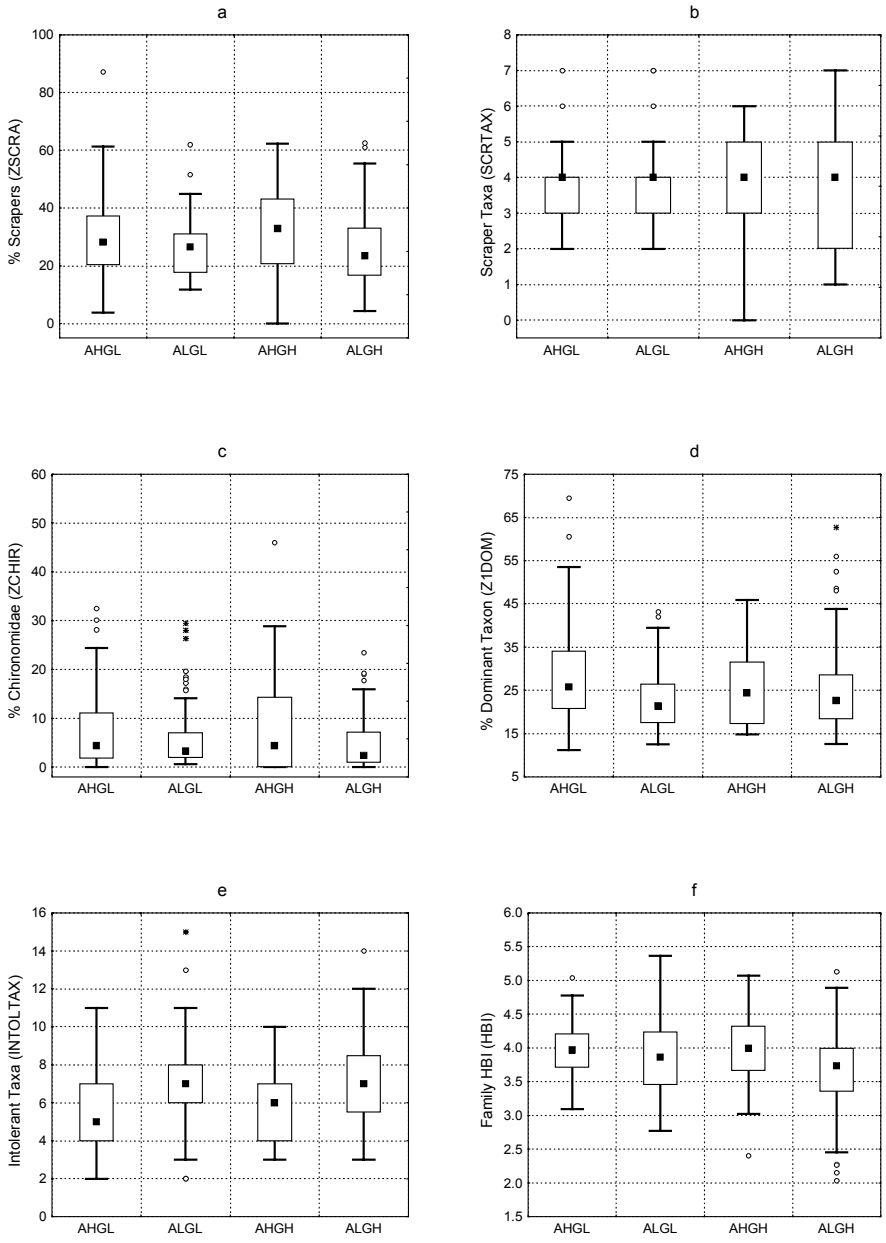


Figure 4-10. Selected benthic metric boxplots in reference samples by conductivity/gradient classes (2) a = % Scrapers; b = Scraper taxa; c = % Chironomidae; d = % Dominant taxon; e = Intolerant taxa; f = Hilsenhoff family index.

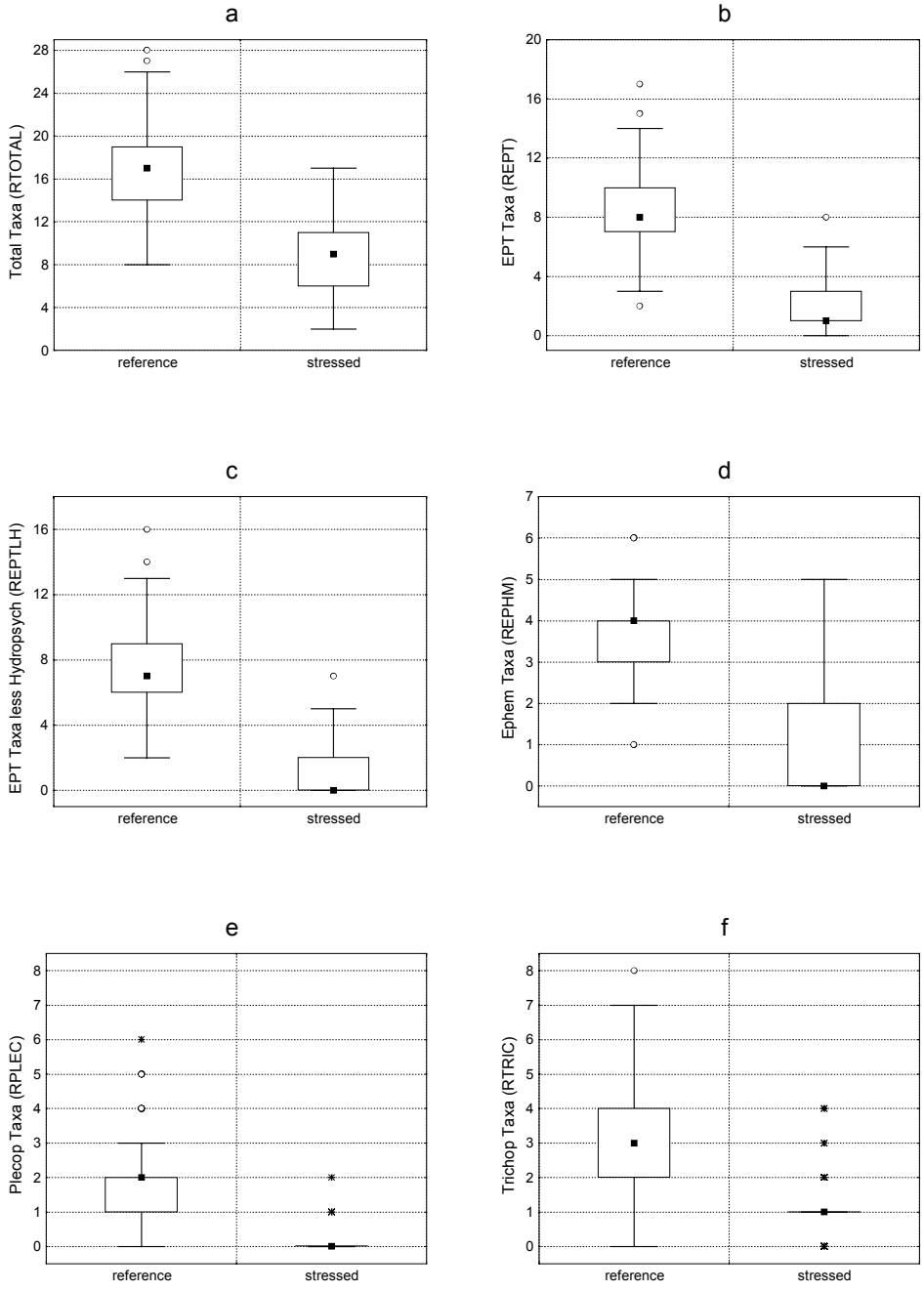


Figure 4-11. Discriminatory ability of candidate metrics for Virginia streams, using 1994-1998 data from non-coastal reference and stressed sites: a = Total taxa; b = EPT taxa; c = EPT taxa excluding Hydropshychidae; d = Ephemeroptera taxa; e = Plecoptera taxa; f = Trichoptera taxa.

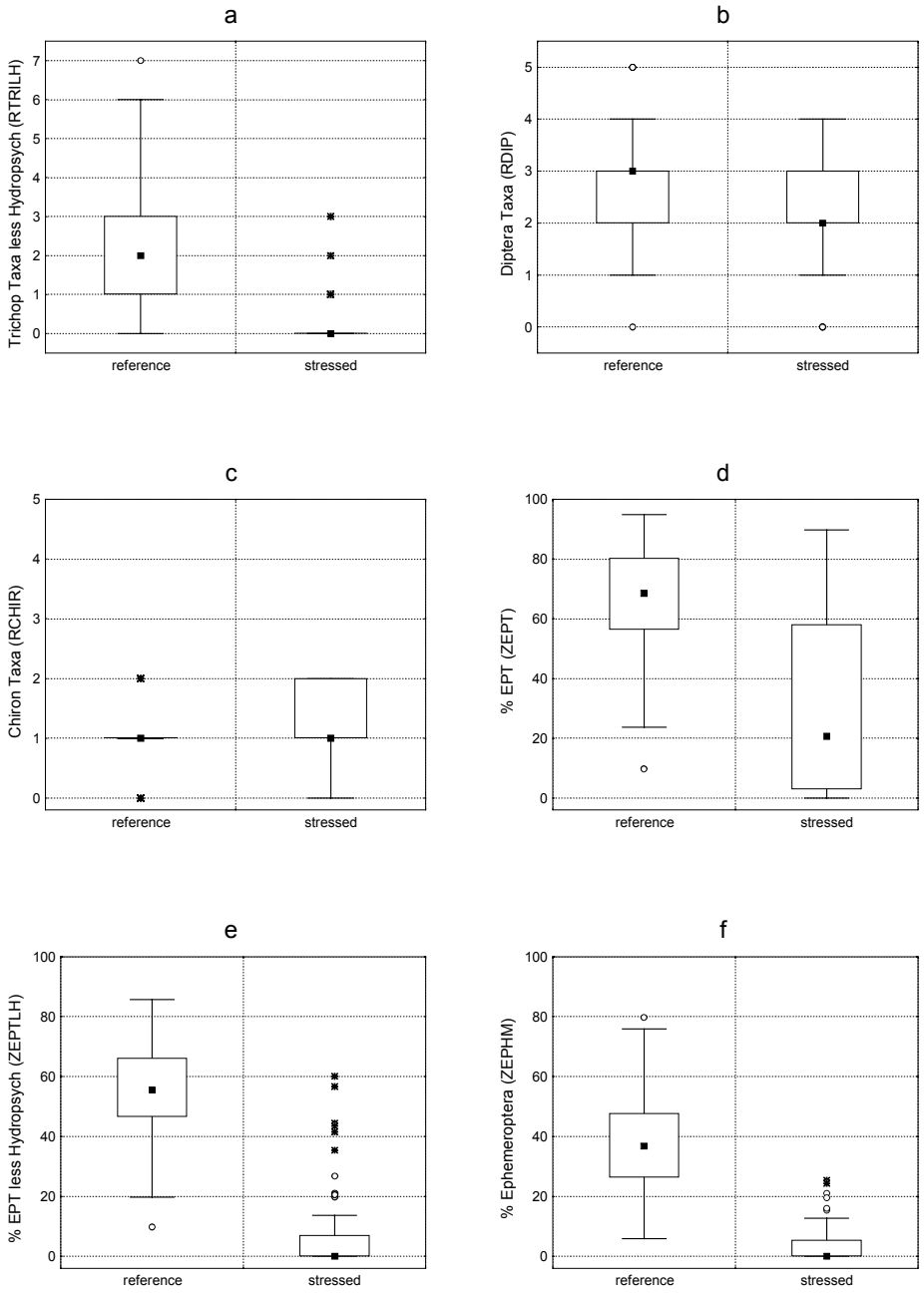


Figure 4-12. Discriminatory ability of candidate metrics for Virginia streams, using 1994-1998 data from non-coastal reference and stressed sites: a = Trichoptera taxa excluding Hydropsychidae; b = Diptera taxa; c = Chironomidae taxa; d = Percent EPT; e = Percent EPT excluding Hydrophychidae; f = Percent Ephemeroptera.

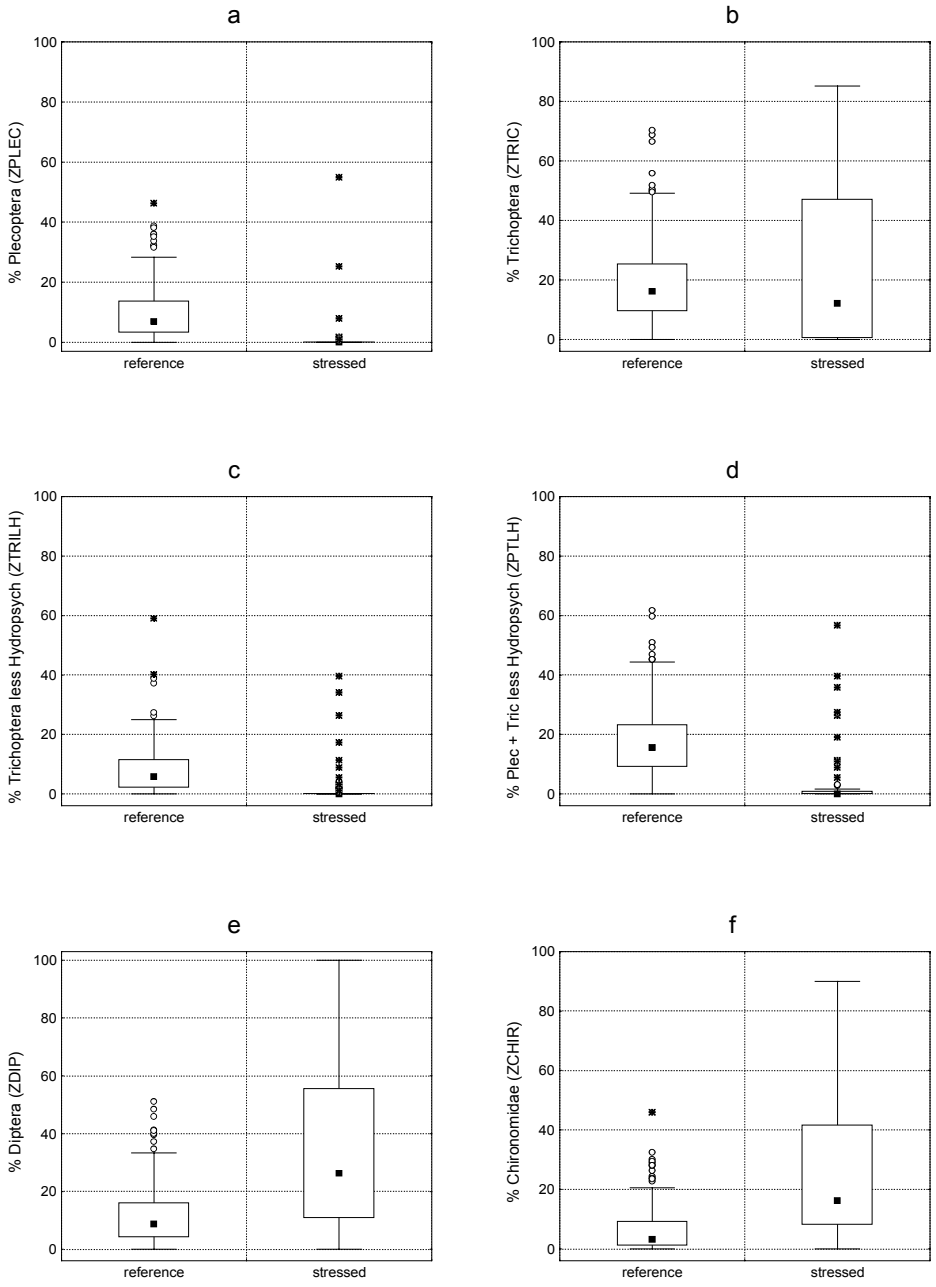


Figure 4-13. Discriminatory ability of candidate metrics for Virginia streams, using 1994-1998 data from non-coastal reference and stressed sites: a =Percent Plecoptera; b = Percent Trichoptera; c = Percent Trichoptera excluding Hydropsychidae; d = Percent Plecoptera plus Trichoptera excluding Hydropsychidae; e = Percent Diptera; f = Percent Chironomidae.

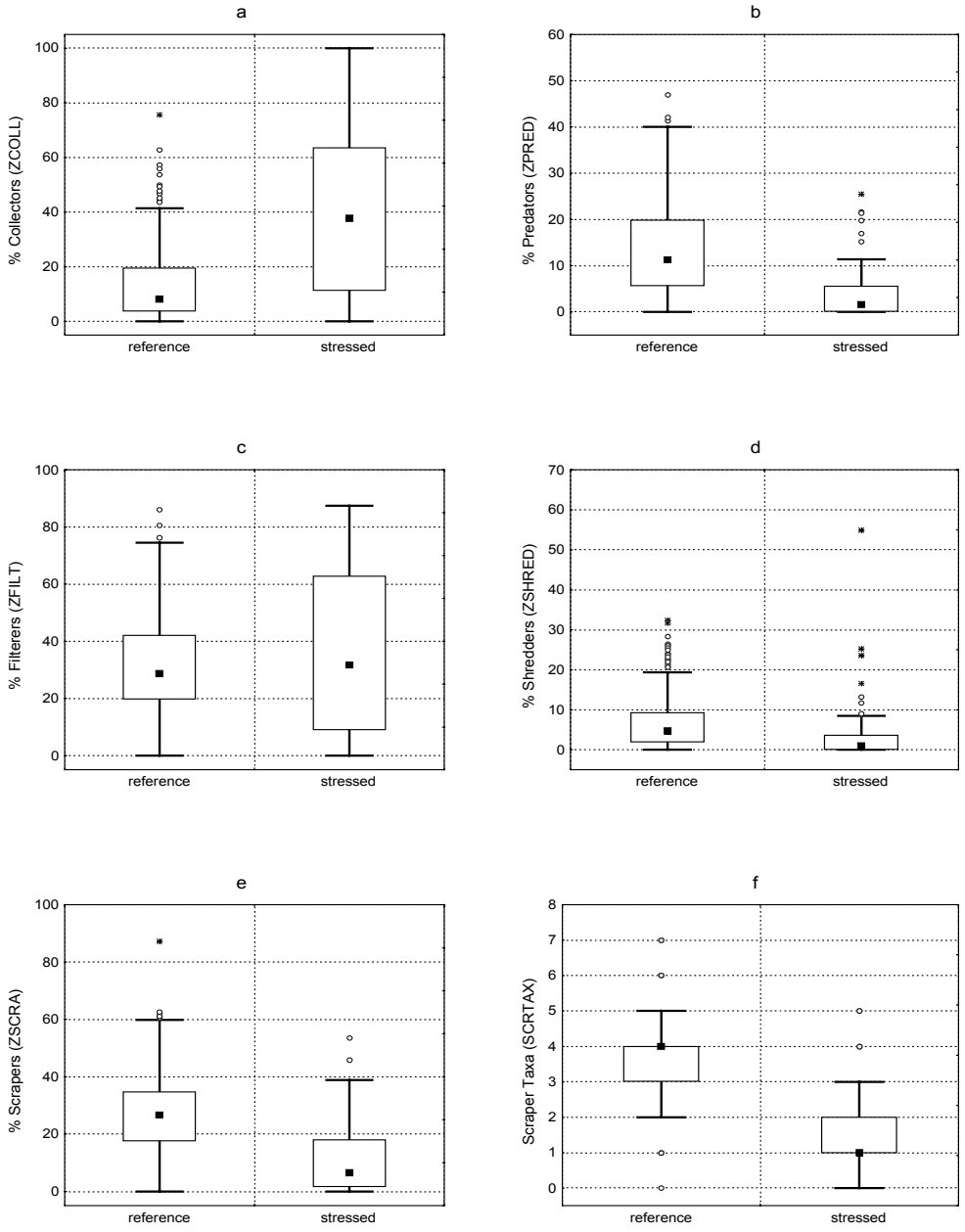


Figure 4-14. Discriminatory ability of candidate metrics for Virginia streams, using 1994-1998 data from non-coastal reference and stressed sites: a =Percent Collectors; b = Percent Predators; c = Percent Filterers; d = Percent Shredders; e = Percent Scrapers; f = Number Scraper Taxa.

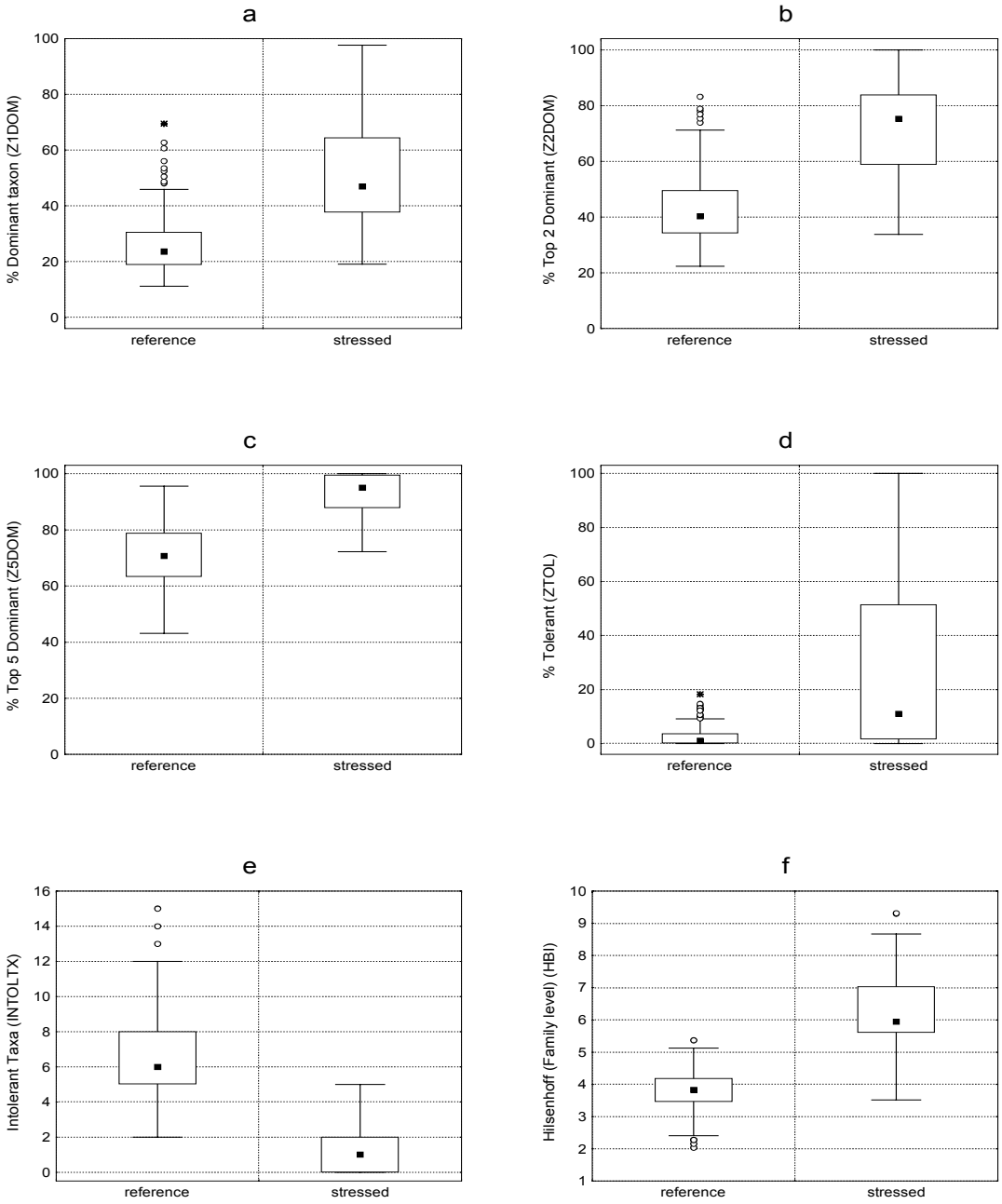


Figure 4-15. Discriminatory ability of candidate metrics for Virginia streams, using 1994-1998 data from non-coastal reference and stressed sites: a = % Dominant taxon; b = % Top 2 dominant taxa; c = % Top 5 dominant taxa; d = % Tolerant; e = Intolerant taxa; f = Hilsenhoff family index.

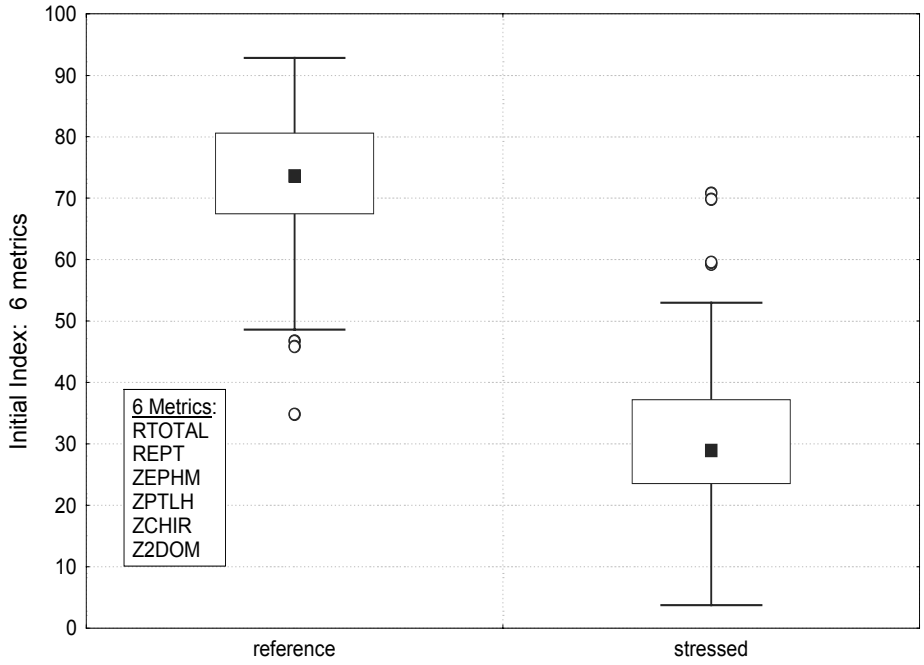


Figure 4-16. Multimetric index tested with six initial core metrics, 1994-98 development data.

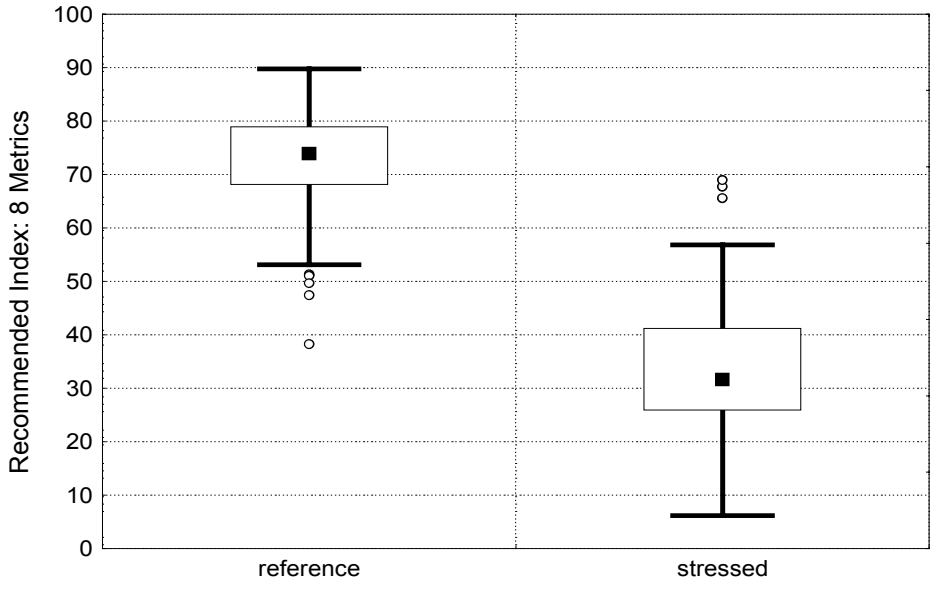


Figure 4-17. Multimetric index tested with eight recommended core metrics, 1994-98 development data.

5. Index Testing and Confirmation

Virginia DEQ provided additional data, collected from Spring 1999 through Spring 2002, with which we tested the stream condition index that was developed as described in Chapter 4 (Table 4-2, Figure 4-17). For the working index to be valid, it should separate *a priori* reference from stressed sites in the new data as well as it did in the original data that were used to develop the index.

As in the 1994-1998 original data set, the 1999-2002 validation data consisted of sites that were sampled various numbers of times, ranging from only one sample per site up to seven samples per site (e.g., spring and fall each year from Spring 1999 through Spring 2002). Basic field water quality data and RBP physical habitat data again were recorded for each sample at the time of macroinvertebrate collection for most samples. The new data set consists of 733 samples collected at 263 stations on non-coastal streams of stream orders 1-4. Candidate reference and stressed sites in the new data set were identified using non-biological criteria as in the original data set, as described in the next section.

5.1 *A priori* criteria applied to test data

Reference sites

We averaged the multiple physical habitat and field chemistry samples for each site in the 1999-2002 data set and applied the same *a priori* reference selection criteria to the average site measurements as had been applied when screening for candidate reference sites in the original data (Section 3.3). Samples were screened according to the nine basic reference criteria listed in Section 3.3. We reviewed database comment fields to exclude sites that had passed the initial screening, but may have been affected by point source discharges, channel alteration, or other anthropogenic disturbances. Reference sites and descriptions for both phases of the project (index development and index testing) are provided in Appendix A. The numbers of reference sites and samples used in development vs. testing of the index are compared in Table 5-1.

Table 5-1. Sample sizes for index development and test.

	Reference	**Stressed**
Index development	62 (247)	25 (71)
Index testing	82 (214)	25 (60)
Sites revisited in test	28	5
Total	116 (461)	45 (131)

Stressed sites

The same criteria were used to select *a priori* stressed sites from the new 1999-2002 data set as had been used to identify stressed samples in the original data (see Section 3.5). The criteria were applied to the 1999-2002 site averages, and a site was labeled as stressed if its measurements satisfied any one of the criteria for stress (Section 3.5). Using this process, 60 samples from 25 sites in the 1999-2002 data were labeled as stressed for the purpose of testing the macroinvertebrate stream condition index.

Locations of biomonitoring sites from the new and original data sets are displayed on the map in Figure 5-1. Sites that are part of both the original and test data sets are displayed with coding applicable to the test data (1999-2002) (compare Figure 3-1).

5.2 Revising the Index (SCI)

The Draft Virginia macroinvertebrate stream condition index (SCI) in 1999-2002 test data shows good separation between *a priori* reference and stressed sites, as it did in 1994-1998 development data (Figure 5-2). Figure 5-3 displays the results of Draft SCI values in all combined data, 1994-2002. Again, the majority of *a priori* reference sites are clearly separated from *a priori* stressed sites (Figure 5-3).

All samples were combined to refine the working index and make use of the entire 1994-2002 data set. Percentile distributions of each metric's values were determined for the entire data set (n=1671 samples). The 95th or 5th percentile standard "best" values were determined for each benthic metric from this combined set of all samples (Table 5-2). Differences between the Draft and Revised standard percentile values are small, indicating stability of these metrics in the Virginia data set. Metrics were scored again as described in Section 3.6, using the revised standard values as reported in Table 5-2 (1994-2002 combined data). Figure 5-4 displays the distributions of the resulting revised SCI values in 1994-2002 *a priori* reference and stressed samples, and Figure 5-5 displays how this revised index performs to differentiate reference from stressed sites for each non-coastal Level III Ecoregion in Virginia. Because criteria for "stressed" sites were set to select the very worst sites, these sites are underrepresented in Figure 5-5 in the Blue Ridge and Northern Piedmont. For the other ecoregions, the separation between *a priori* reference and stressed samples is clear.

The 1999-2002 data set included 54 new reference sites, among which eight were in the Piedmont (Ecoregion 45). This raised the total number of Piedmont reference sites to 12. Figure 5-5 clearly shows that the Piedmont reference scores are similar to other reference site scores.

The combined data set also suggests that the Central Appalachians (Ecoregion 69) score lower than the other regions. There were only 11 reference samples from seven sites in the Central Appalachians, a sample too small to give much confidence in the difference. A separate study in Tazewell County, VA, also suggests that unimpaired Central Appalachian sites score lower than

sites in other regions (Passmore et al., personal communication). Most of the Central Appalachian reference samples score below the 25th percentile of the other four regions. This suggests that the Central Appalachians may be different, and should be re-examined with a better set of reference sites.

Table 5-2. Comparison of standard metric values in development data vs. test data.

	1994-1998 development data (n=938 samples)	1994-2002 combined data (n=1671 samples)
Metrics that decrease with stress	Standard (best value) X_{95}	
Total taxa	22	22
EPT taxa	11	11
%Ephemeroptera	58.9	61.3
% Plec+Tric less Hydropsych.	34.8	35.6
% Scrapers	49.1	51.6
Metrics that increase with stress	Standard (best value) X_5	
% Chironomidae	0	0
% Top 2 Dominant	29.5	30.8
HBI (family)	3.2	3.2

Figures 5-2 through 5-5 indicate that some of the samples included in the reference set scored well below the inter-quartile range of the general distribution of reference SCI scores. It is possible that a generally-good reference site may have scored particularly low on just one occasion for some unknown reason. Virginia DEQ biologists may need to re-evaluate other low-scoring reference sites to determine whether factors not observed in this project may exclude these sites from Virginia reference condition.

We examined sites that had at least one score below the "inner fence" (= 1.5 IQR; VSCI $\leq$ 53) of the reference distribution. By looking at the distribution of scores for each of these sites, we can examine whether the low scores are singular events or a predictable pattern. A site that consistently scores low may be impaired by an unknown or undetected stressor, and may require further investigation. The ten low-scoring reference sites suggest that some are acceptable as reference sites, and others will require re-evaluation (Figure 5-6, see also Appendix A and Appendix D). Three of the sites in Figure 5-6 appear to be adequate reference sites with one or two low scores: GCR00001 in the Blue Ridge, and NFH09847 and ROA22454 in the ridge and valley. The two Central Appalachian sites are not markedly below other CA reference sites. The other five sites are farther below the reference distribution, and should be re-examined for undetected stressors or disturbance.

5.3 Index Variability

The Virginia macroinvertebrate data set included many sites that had been visited multiple times, twice per year (spring and fall index periods) for up to ten years. These data allowed us to estimate variability among seasons, between consecutive years (same season), and among multiple years. These components of variability could be compared to the overall variability among all sites in the data set. The estimated standard deviations are shown in Table 5-3.

Table 5-3 shows that the fall index period results in the lowest variability of SCI values (s.d. of 5.88 SCI units for observations 1 year apart). The spring index period had slightly higher variability (s.d = 8.21 units). The variability among sites within ecoregions is only slightly higher (s.d. = 9.75 units). These yield coefficients of variation of 8-12% for the variability of single observations at sites. These estimates are all components of natural variability: seasonal, multi year, multi site, and ecoregional. We were not able to estimate variability due to measurement error (methodological variability), which would require repeated samples during a sampling event. The variability estimates shown in Table 5-3 indicate that index values within sites are relatively stable among seasons and among years.

Table 5-3. Estimated standard deviation of Virginia SCI, based on repeated observations within sites.

Category	n	s.d.	Ref. mean	C.V. (%)[1]	Notes
Between Season	235	8.65	68.8	12.6	Within-site; all spring-fall observations within single year
1 yr, fall	205	5.88	69.4	8.5	Within-site; all fall observations 1 year apart
all fall	264	6.64	69.4	9.6	Within-site; all fall observations (1-5 yr)
all spring	190	8.21	68.2	12.0	Within-site; all spring observations (1-5 yr)
fall site means within ecoregion	88	9.75	n.a.	n.a.	Among sites within ecoregion; site means, fall, reference sites only
ecoregion	4	11.35	n.a.	n.a.	Among ecoregions, fall, reference sites

[1] C.V. based on mean of reference sites, although s.d. was estimated for all sites

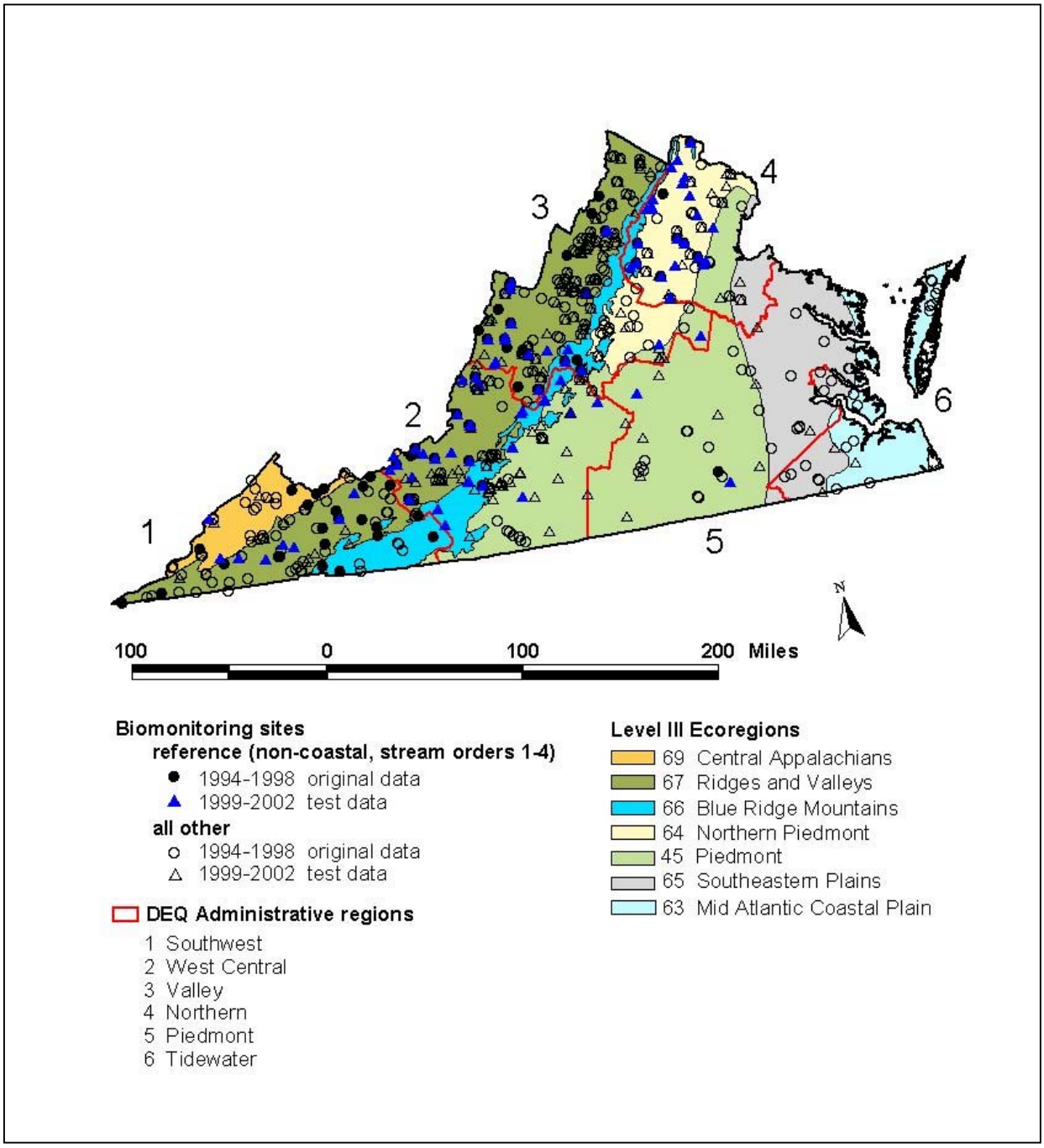


Figure 5-1. Virginia DEQ administrative regions (not including the recently added South Central Region), Level III Ecoregions, and biomonitoring sites used to develop and test a non-coastal plain macroinvertebrate stream condition index.

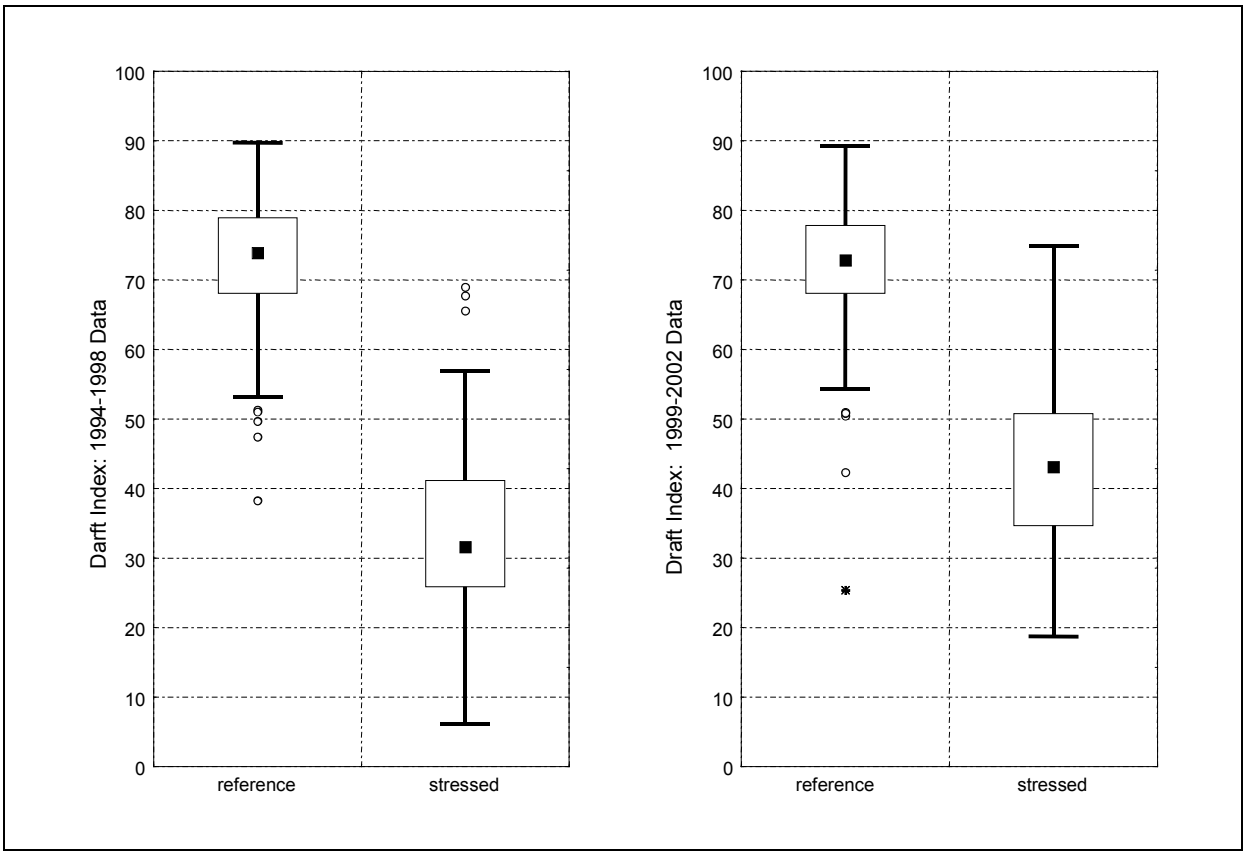


Figure 5-2. Virginia Draft SCI separation between *a priori* reference and stressed samples in 1994-1998 original data set (left) and in 1999-2002 test data set (right).

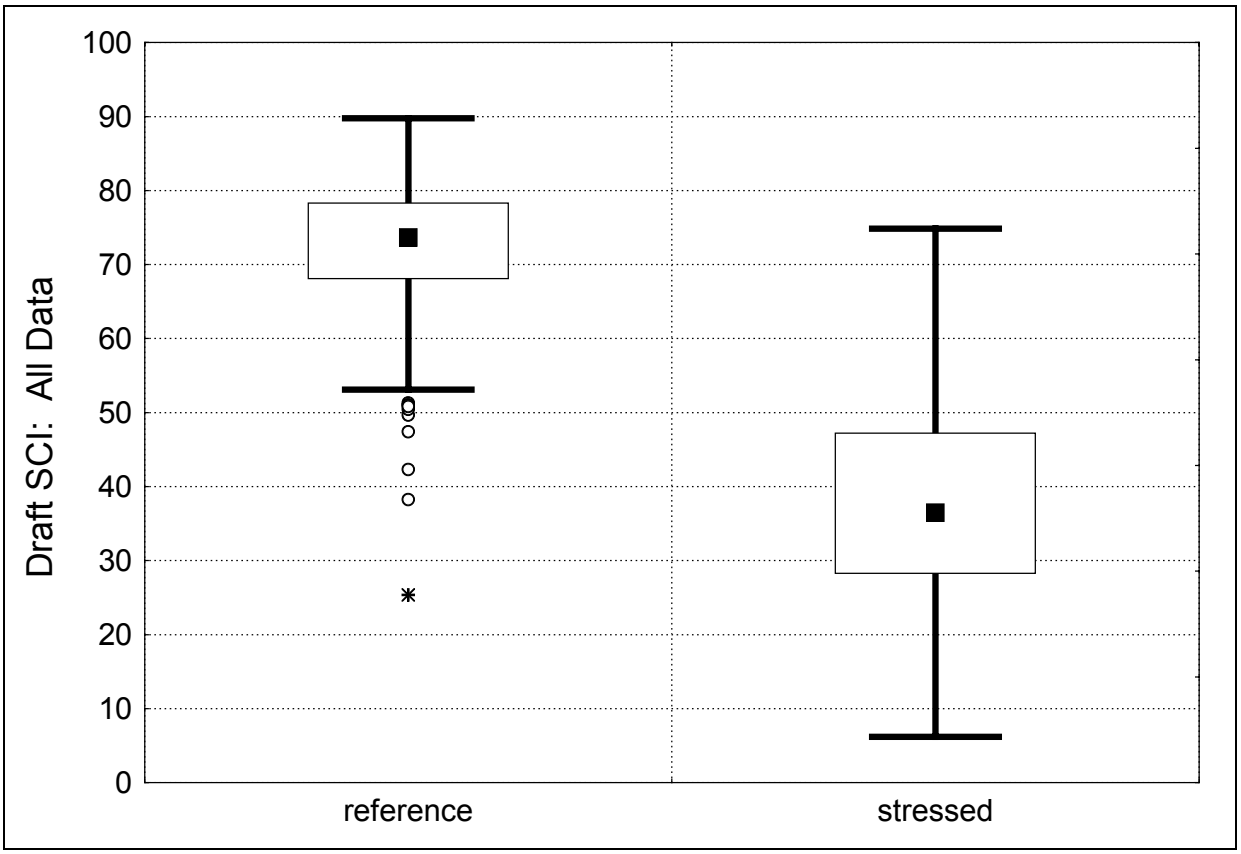


Figure 5-3. Virginia Draft SCI separation between *a priori* reference and stressed samples in combined 1994-2002 samples.

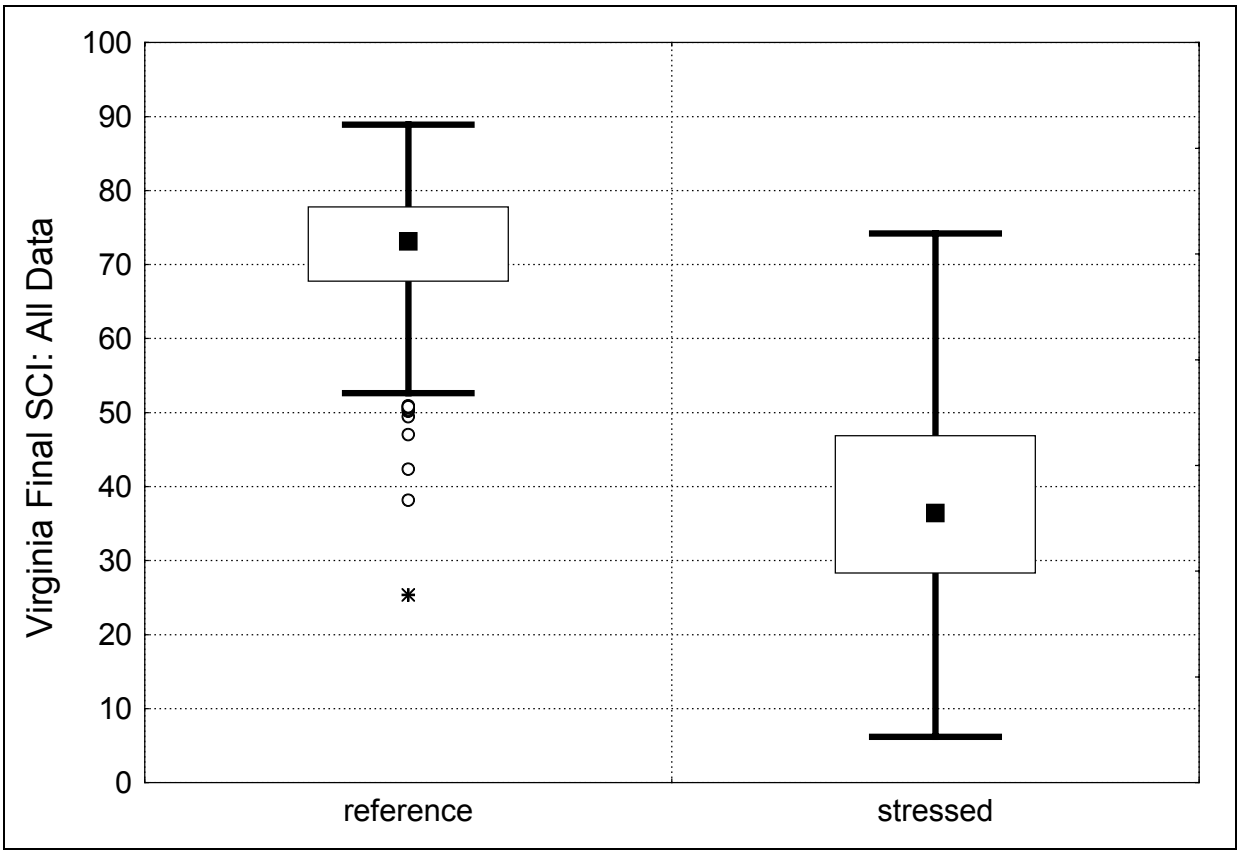


Figure 5-4. Virginia Revised SCI separation between *a priori* reference and stressed samples in combined 1994-2002 samples.

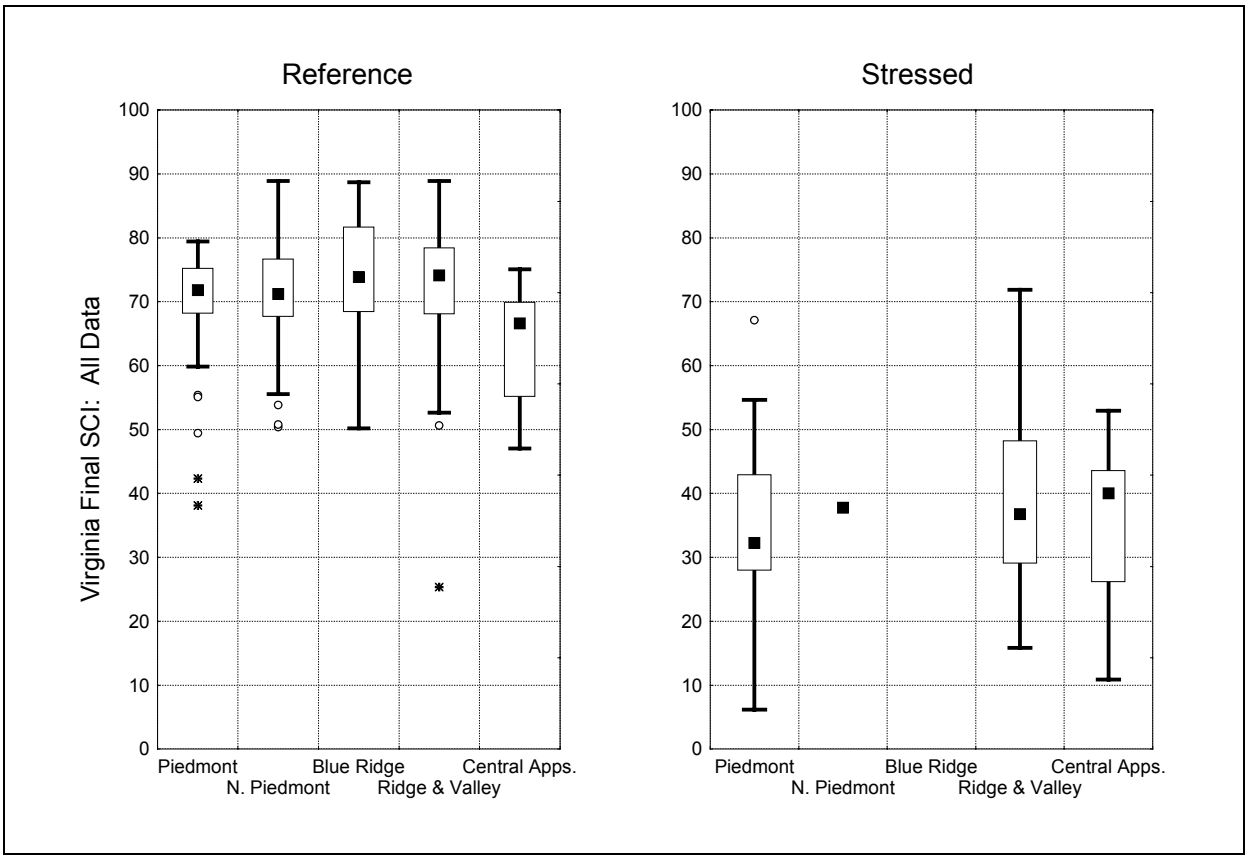


Figure 5-5. Virginia Revised SCI separation between *a priori* reference and stressed samples in combined 1994-2002 samples, separated by Level III Ecoregion.

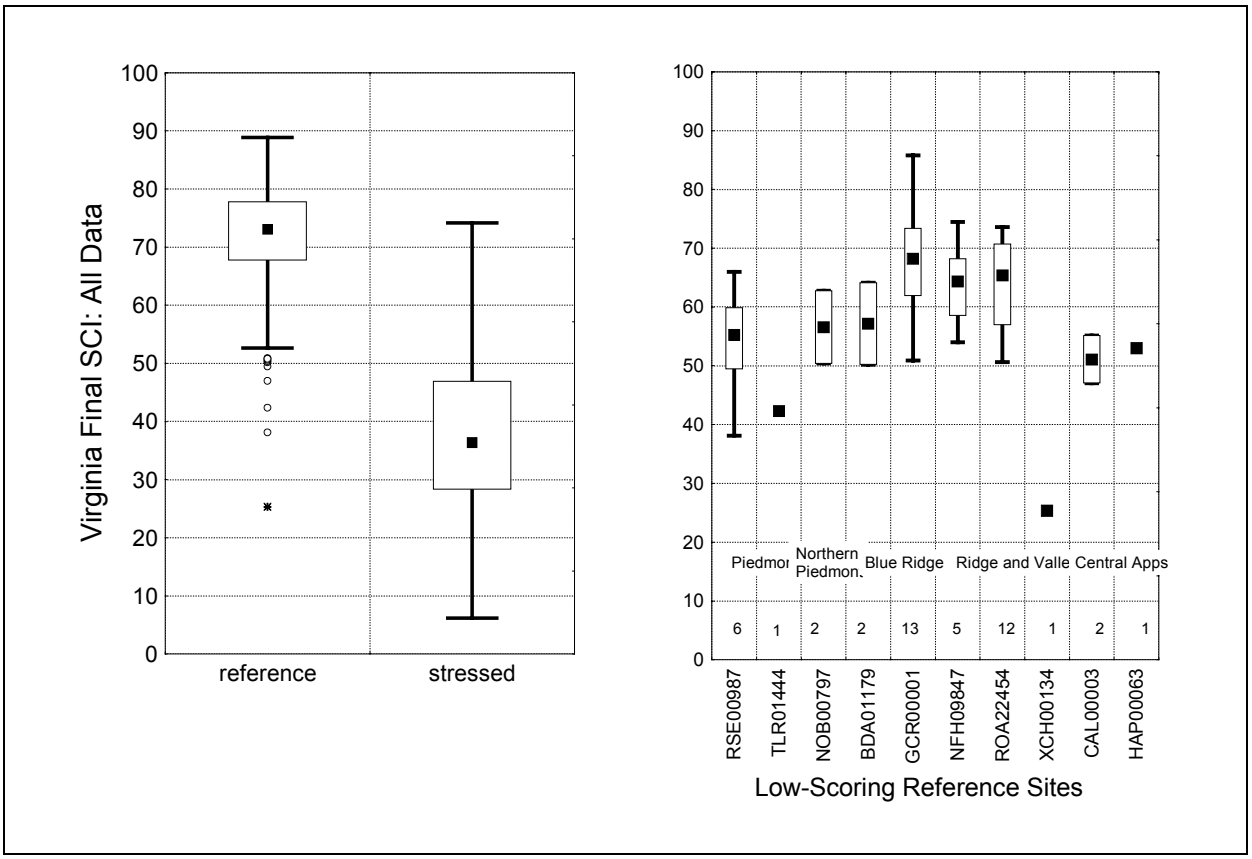


Figure 5-6. Virginia Revised SCI scores in multiple samples at the 10 lowest scoring reference sites. Left: SCI scores in all 1994-2002 reference samples vs. stressed samples (after Figure 5-4). Right: Low outliers indicated in the reference distribution on the left are displayed again on the right along with all other SCI scores from different sampling dates at the same sites. Numbers of samples per site, and Level III Ecoregions of those sites, are indicated.

6. Conclusions and Recommendations

The proposed non-coastal multimetric benthic stream index developed in this report provides good separation between *a priori* reference and stressed stream sites. This revised index is sufficient to develop numeric biocriteria for most of the upland region of Virginia as explained below.

6.1 Conclusions

In addition to developing a condition index for Virginia streams, seven questions were identified for application and implementation of the index (Chapter 2). Each of these questions is addressed below.

Are the existing fixed-site data sufficient to develop biocriteria for Virginia?

The initial 1994-1998 fixed-site data set was not sufficient to develop biocriteria, because there were too few sites that met reference site criteria in selected regions of the state. In 1999-2002, DEQ identified and sampled additional reference sites in under-represented regions, especially in the Piedmont.

The new data, used to test and revise the initial working index, improved the extent and representativeness of sites throughout Virginia's ecoregions. With the added reference data, the SCI is now sufficiently robust for operational assessment in Virginia's non-coastal ecoregions, except perhaps in the Central Appalachians which are still underrepresented. The index should continue to be verified as Virginia DEQ continues to expand its monitoring network.

Do the data indicate variability due solely to methods differences between the VDEQ regional offices?

Efforts by VDEQ to standardize its SOPs and QA/QC procedures across administrative regions have improved data quality over the course of the 1994-2002 period encompassed by this project. Regional variation in procedures in the earlier time period in this data set confounded the ability to conclude from this analysis whether methods differences have contributed significantly to the variability of these data. We recommend development of a program for state-wide training, cross-calibration, and QA to ensure that all regional personnel are using the same methods and obtain comparable results statewide.

What is the most appropriate site classification for assessing stream health across Virginia?

The current classification for Virginia stream benthic macroinvertebrate communities is that Coastal Plain (consisting of Atlantic coastal plain and southeastern plains and hills ecoregions) and upland (non-Coastal Plain) are distinct. No further subdivision is recommended at this time, however, a separate assessment threshold for the Central Appalachian may be required if additional reference data indicate that the Central Appalachians differ from other regions. This study did find minor differences in invertebrate species composition among ecoregions of the upland areas, including the Northern Piedmont and the Appalachian ridge regions (Blue Ridge and Ridge and Valley), but these compositional differences did not affect SCI values.

What, if any, are the seasonal differences in biological metrics? Are two index periods required for monitoring?

Seasonal differences in both family-level composition and biological metrics were negligible. Two index periods are not required. The Fall index period has slightly lower variability than the Spring index period (Table 5-3), and is therefore preferred on the basis of variability. Other considerations (logistical, ease of identification) may favor a spring index period.

Which metrics are most appropriate for use in a Virginia multimetric macroinvertebrate stream condition index?

The multimetric index proposed here consists of 8 metrics (Table 6-1):

Table 6-1. Metrics for revised Virginia non-coastal benthic multimetric index.

Metrics that decrease with stress	Standard (best value) X_{95}	X_{min}	Standardization equation (Section 3.6, Equation 1; X=metric value)
Total taxa	22	0	score = 100 × (X/22)
EPT taxa	11	0	score = 100 × (X/11)
%Ephemeroptera	61.3	0	score = 100 × (X/61.3)
% Plec+Tric less Hydropsych.	35.6	0	score = 100 × (X/35.6)
% Scrapers	51.6	0	score = 100 × (X/51.6)
Metrics that increase with stress	**Standard (best value) X_5**	**X_{max}**	**Standardization equation (Section 3.6, Equation 2; X=metric value)**
% Chironomidae	0	100	score = 100 × [(100-X)/(100-0)]
% Top 2 Dominant	30.8	100	score = 100 × [(100-X)/(100-30.8)]
HBI (family)	3.2	10	score = 100 × [(10-X)/(10-3.2)]
Final index score for a site is determined by averaging the site's 8 unitless standardized metric scores, using a maximum metric score of 100 for any metric whose individual score at a site exceeded 100.			

What thresholds indicate the degree of comparability of Virginia streams to reference condition?

As defined by EPA, biocriteria are narrative descriptions or numerical values of the structure and function of aquatic communities in a water body necessary to protect the designated aquatic life use, implemented in or through water quality standards (U.S. EPA 1996).

The reference distribution is used to define biocriteria with respect to Virginia's designated aquatic life uses. Below we discuss three considerations for developing criteria from a distribution of reference site index scores representativeness, variability, and decision criteria:

Are the reference sites representative of natural stream types and of reference condition? If reference sites are not representative of minimally disturbed, or at worst, least disturbed conditions, then criteria may be set too low, and may not meet the goals of the CWA. If the reference sites are not representative of the ecotype or ecoregion, then criteria may also be inappropriate.

The final reference distribution (Figure 6-1) was based on 461 samples from 116 reference sites in five ecoregions of the Virginia uplands. Based on the similarity of reference site scores among four of the five ecoregions (Figure 5-5), and on ordination results discussed in Chapter 4, the reference sites appear to be representative of the uplands, with the possible exception of the Central Appalachians.

Candidate reference sites originally identified by VDEQ were screened with the reference site criteria agreed upon by VDEQ biologists (Section 3.3). The screening excluded sites that may have been a site-specific reference in earlier studies, but that did not meet the criteria for regional reference. While the reference criteria do not define pristine sites, nor even a minimally disturbed condition, they do represent the least disturbed condition readily available in the state. Further work by VDEQ may refine the reference condition and identify minimally disturbed sites, but it is unlikely to alter the basic conclusions here.

The exception is the Central Appalachian ecoregion, which appears to be dissimilar to the other upland areas (Figure 5-5), but has only nine reference sites to date. The sites may have a legacy of past disturbance not reflected in current water quality and habitat. The West Virginia index (WVSCI; Gerritsen et al. 2000) is calibrated for the Central Appalachians and may be more appropriate for VDEQ to use, primarily because the Central Appalachians are a very small part of Virginia but comprise a large proportion of West Virginia.

The index also does <u>not</u> apply to stream classes or types that were not sampled in the database, in particular, limestone springs and higher-order rivers. Data collected by other states suggest that limestone springs have different fauna, but no samples in the reference database were definitively identified as limestone springs.

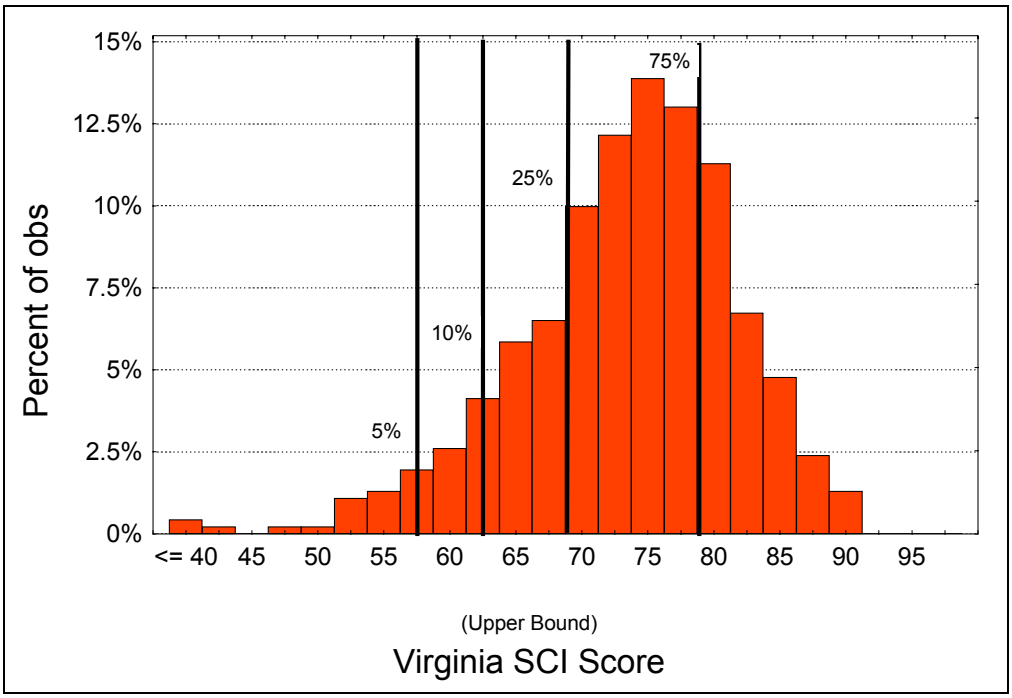


Figure 6-1. Distribution of reference site SCI scores, showing selected percentiles. Numbers on x-axis indicate upper bound of bar.

What is the natural variability of the chosen index and the reference sites? Natural variability determines the amount of "spread" in reference condition and must be considered in setting biocriteria thresholds.

Variability was documented in Section 5.3, and the combined natural and methodological variability of single site scores (fall index period), as expressed by standard deviation, is approximately seven points of the index, or 10% of the reference site mean (Table 5-3). This is comparable to the standard deviation among all samples (Table 6-2). The similar values for intra-site, inter-site, and inter-region standard deviation also suggest that the classification is fully adequate.

The reference site distribution of Virginia SCI scores is shown in Figure 6-1 and Table 6-2. Although reference sites for Virginia are considered "least disturbed" the distribution of reference scores is relatively tight, with an interquartile range of only 10.1 (Table 6-2). The distribution is skewed to the left (Figure 6-1), and several sites have low scores. The presumption of "least disturbed" reference sites is that some of the reference sites are stressed and may have lower scores than minimally disturbed reference sites. This results in the left-skewed distribution of the SCI.

Table 6-2. Percentile distributions of index (SCI) values in Virginia DEQ 1994-2002 reference samples.

Data set	Draft SCI (1994-1998 development data)	Revised SCI (1994-2002 combined data)
N	247	461
maximum possible	100	100
maximum in data	89.7	88.9
95th	84.7	84.1
90th	82.6	81.7
75th	78.9	77.8
50th (median)	73.9	73.1
25th	68.1	67.7
10th	61.9	61.3
5th	56.3	56.3
minimum	38.2	25.3
standard deviation	8.34	8.40
mean	73.0	72.08

What level is protective and meets the goals of the Clean Water Act; i.e., to protect and restore chemical, physical and biological integrity of Virginia's waters, and yet does not lead to undue regulation and unnecessary effort? A common biocriteria threshold selected by many states is the 25th percentile of the reference distribution (e.g., Ohio; Yoder and Rankin 1995). Although the 25th percentile means that 25% of reference sites do not meet biocriteria, this is appropriate where reference sites are judged to represent least disturbed conditions, which may be significantly different from undisturbed or minimally disturbed conditions.

Another approach is to define criteria tiers corresponding to tiered aquatic life uses, including such categories as "outstanding natural resource waters", "natural warm water habitat", "historically modified habitat", etc. (e.g., Davies et al. 1993, Yoder and Rankin 1995). A range or band of the SCI score would correspond to each aquatic life use tier. A site is then rated impaired if it falls below the criterion for its designated tier.

Several percentiles are shown on the histogram of reference scores (Figure 6-1). Because of the tail of poorer-scoring reference sites, a 5th percentile biocriteria would still comprise part of the tail and degradation from "least disturbed" sites. The 25th percentile, however, is clearly well within the bulk of the distribution, and may exclude many undisturbed sites. We recommend the

10th percentile (Figure 6-1), as being above most of the tail, and yet below the bulk of reference sites. Any site scoring below the 10th percentile should be considered impaired. Reference sites scoring below the 10th percentile may be impaired due to historic or unknown stresses, or they may have been sampled following natural stresses (drought, flood, etc.).

The distribution of reference site scores allows identification of bands or tiers to correspond to different levels of biological quality (Figure 6-2). The range from the 10th to the 90th percentile of the reference samples comprises 80% of the reference, and represents the "location" of the reference on the VSCI scale. This represents biological integrity as defined by these least impaired reference sites. The 80% range could be used to define tiers: sites consistently scoring above the 90th percentile have high scores for all metrics, and may represent exceptional waters. Proposed tiers and corresponding VSCI score ranges are shown in Figure 6-2. Adoption of tiered life uses would allow more realistic management of aquatic biological condition.

What improvements can be made to better define the reference condition for ecosystem health of Virginia streams?

See Recommendations, below.

6.2 Recommendations

Recommendations from this study for improving VDEQ monitoring address sampling methods index testing and confirmation, and sampling design.

Sampling methods. The Virginia DEQ field and laboratory methods should be consistent and compatible across the state, among all DEQ administrative regions. We recommend that Virginia DEQ continue implementing consistent QA and sampling methods for all upland (non-Coastal Plain) streams across the state. We recommend laboratory, not field, sorting and identification of benthic macroinvertebrates sampled. Although experienced and skilled field biologists can effectively sort and identify in the field, laboratory identification is much more consistent because the constant indoor working conditions remove effects of variable lighting and weather, and laboratory results can be checked for QA. With respect to specific sampling methodology, clearly applied consistency across all regions is more important than finding the apparent "best" method. Virginia's current Coastal Plain methods are consistent with other Coastal Plain states (Maxted et al. 2000).

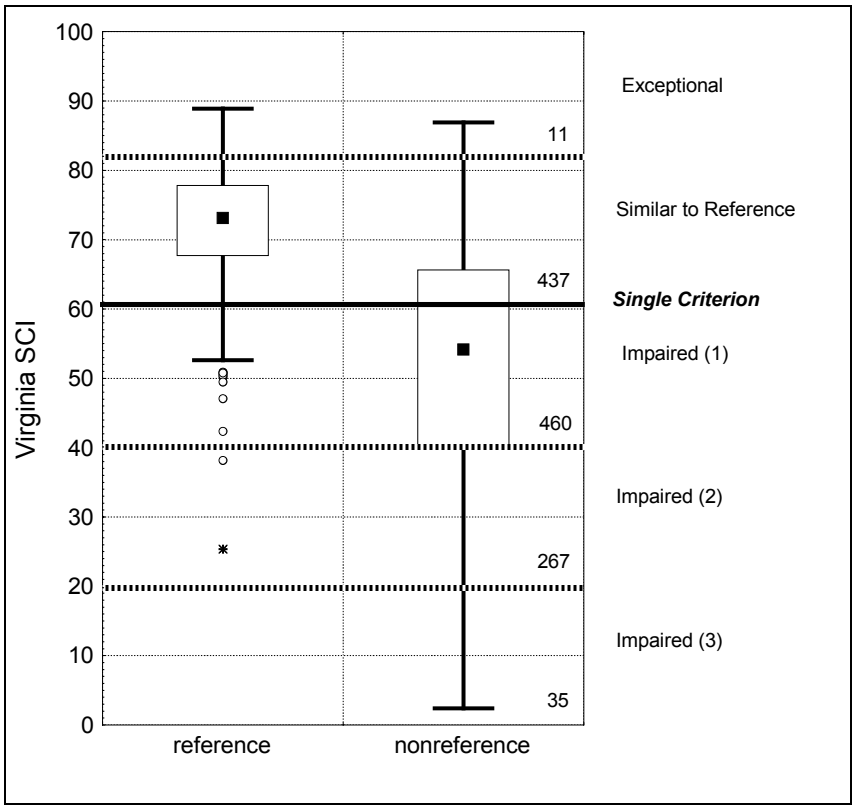


Figure 6-2. Potential aquatic life use tiers that can be discerned using the Virginia SCI. The solid line is the recommended single (non-tiered) biocriteria threshold, at a VSCI score of 61. Numbers along the right-hand axis are the number of nonreference samples in the 1994-2002 data in each respective tier.

Index testing and confirmation. The increased number of reference sites sampled in the 1999-2002 data set helped to confirm reference conditions as well as the SCI index developed here. With the exception of the Central Appalachians, there are now enough reference sites for operational implementation of biocriteria.

Neither the reference condition nor the index should be viewed as static and unchanging. While the data are sufficient to implement biocriteria, they can always be improved with continued and enhanced reference site sampling. We recommend:

- further effort to identify minimally disturbed reference sites throughout Virginia
- identification and sampling of reference sites in the Central Appalachians. Alternatively, Virginia DEQ could make use of West Virginia data from the Central Appalachians. Sampling methods are the same, and DEQ could apply the Virginia SCI to both Virginia and West Virginia reference sites to determine biocriteria thresholds.

- recalibration of the SCI after new data have accumulated to obtain a more representative index.

Sampling design. Virginia DEQ's sampling design has consisted of fixed, pre-determined stations sampled in spring and fall for several years. Reference sites were selected to be references for particular stressed sites. This design raises two problems for developing regional-based biocriteria:

- representativeness of the reference sites for each ecoregion, and

- pseudoreplication, or artificial inflation of sample size by repeat sampling of the same sites (Hurlbert 1984).

In the absence of a more comprehensive data set, we have assumed that the repeated observations are independent, and that the reference sites are representative of their respective ecoregions. Benthic macroinvertebrate samples separated by a year or more tend to be effectively independent, because the variability of the repeated samples is similar to the variability within a regional class (Table 5-2). We recognize that pseudoreplication remains an issue for the Virginia data set, and the number of independent samples is less than the number of observations.

In order to optimize VDEQ sampling effort to obtain the most information for the resources, we recommend the following:

- Discontinue sampling paired reference sites selected only for proximity to an assessment site or watershed. With adoption of the SCI, regional reference condition is sufficient and paired watersheds are no longer necessary. The exception to this rule is paired upstream-downstream and before-after samples for tests of point source impacts. These are required for BACI designs to test for degradation (Underwood 1994), independent of biocriteria.

- Select a single index period and discontinue repeated monitoring at most, but <u>not</u> <u>all</u> sites. Annual, repeated sampling has two purposes:

  - detection of long-term trends
  - estimation of change in condition due to management actions or known changes in the watershed.

  Special studies often require repeated monitoring to determine changes following new discharges, reduction in discharges, BMP implementation, spreading urbanization, etc. In addition to the defined special studies, a subset of the general monitoring effort should go towards re-sampling sites to determine long-term trends.

- Re-sample a randomly determined subset of QA sites within the index period to estimate measurement error. These samples determine the precision of the method, and error introduced by variations in sampling method, and small-scale spatial variability.

- We support DEQ's efforts to collect chemical samples at the same times and locations as benthic macroinvertebrate samples, to allow for further testing of the benthic macroinvertebrate stream condition index as a reliable water quality indicator, and to develop predictive associations between potential stressors and biological responses.

- It is especially important that reference sites are representative of the region and state. To this end, a probability-based sampling design is an efficient way to obtain a representative sample (Lazorchak et al. 1998). Reference sites can be selected from the data set after sampling (post-stratification). A larger number of independent and representative sites will provide a reliable and comprehensive basis to define defensible reference conditions for Virginia upland streams. A probabilistic design also allows unbiased estimation of stream condition in the entire state, in regions, in counties, or in watersheds. We do not advocate that all sampling should be probabilistic; only that a regular part of the program is probabilistic to estimate status of the resource. Model-based, or non-probabilistic designs will be necessary to determine effects of point sources and to develop models of response to specific stressors or sources. Monitoring or testing of specific management actions (special studies) would not generally use probabilistic designs.

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APPENDIX A

REFERENCE SITE LOCATIONS AND LAND COVER CHARACTERIZATION

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This Appendix provides information about reference sites used for developing and testing the Virginia benthic macroinvertebrate Stream Condition Index. Tables A-1 through A-3 and Figure A-1 characterize the reference sites from the 1994-1998 data set; these sites were used in the index development phase of the project (n=62 sites). Table A-4 reports reference sites from the 1999-2002 data set that were used in testing the index (n=82 sites). Of the original 62 reference sites, 28 were sampled during 1999-2002 and were used again as reference sites during index testing; these 28 sites are marked in Table A-4.

Table A-1. Reference sites used for site classification analysis, 1994-1998 data set. Reference sites (n=62) used for site classification analysis, listed in order by Level III Ecoregion. "Subnum" indicates the Level IV Sub-ecoregion. "RefType" indicates: R1 for sites nominated as reference sites by DEQ regional biologists (n=27 sites/123 samples), R2 for sites identified by independently applying non-biological criteria to samples (n=20 sites/51 samples), and R3 for sites that match both types (n=15 sites/73 samples).

Ecoregion		StationID	Stream Name	DEQ Region	Sub num	County	Lat (dd)	Long (dd)	Stream Order	Ref Type	No. Samples
45	Piedmont	RAP006.53	Rapidan River	Northern	45e	Culpeper	38.359	-77.686	4	R3	10
45	Piedmont	RPP132.67	Rappahannock River	Northern	45e	Culpeper/Fauq	38.422	-77.716	4	R2	4
45	Piedmont	RSE009.87	Roses Creek	Piedmont	45f	Brunswick	36.843	-77.902	1	R1	6
45	Piedmont	TYE026.22	Tye River	Valley	45e	Nelson	37.763	-78.993	3	R3	2
64	Northern Piedmont	CAX004.57	Catoctin Creek	Northern	64c	Loudoun	39.255	-77.577	3	R3	9
64	Northern Piedmont	GOO044.36	Goose Creek	Northern	64c	Fauquier	38.914	-77.922	2	R2	5
64	Northern Piedmont	HAZ042.43	Hazel River	Northern	64c	Rappahannock	38.603	-78.253	2	R3	9
64	Northern Piedmont	ROB001.90	Robinson River	Northern	64a	Culpeper	38.325	-78.096	3	R3	9
64	Northern Piedmont	ROB022.56	Robinson River	Northern	64c	Madison	38.457	-78.302	2	R2	9
64	Northern Piedmont	RPP147.10	Rappahannock River	Northern	64a	Culpeper/Fauq	38.530	-77.814	4	R2	4
64	Northern Piedmont	RPP150.32	Rappahannock River	Northern	64c	Culpeper	38.583	-77.876	3	R2	3
66	Blue Ridge	GCR000.01	Green Creek	W Central	66a	Franklin	37.054	-80.085	1	R1	9
66	Blue Ridge	HTN009.20	Helton Creek	Southwest	66c	Grayson	36.592	-81.532	3	R2	3
66	Blue Ridge	MIO000.35	Mill Creek	Valley	66a	Nelson	37.846	-79.130	2	R1	2
66	Blue Ridge	RDC033.83	Reed Creek	Southwest	66e	Wythe	36.875	-81.125	4	R1	1
66	Blue Ridge	RIC002.95	Big Reed Island Creek	Southwest	66e	Pulaski	36.903	-80.731	4	R2	1
66	Blue Ridge	RIC034.08	Big Reed Island Creek	Southwest	66c	Carroll	36.742	-80.623	4	R2	2
66	Blue Ridge	TYE032.71	Tye River	Valley	66a	Nelson	37.834	-79.018	3	R3	1
66	Blue Ridge	WLC010.20	Whitetop Laurel	Southwest	66c	Washington	36.648	-81.672	3	R3	3

Table A-1 (Continued).

Ecoregion	StationID	Stream Name	DEQ Region	Sub num	County	Lat (dd)	Long (dd)	Stream Order	Ref Type	No. Samples
67 Ridge and Valley	BLD000.22	Buffalo Creek	Valley	67a	Rockbridge	37.679	-79.427	3	R1	4
67 Ridge and Valley	BLP000.79	Bullpasture River	Valley	67b	Bath	38.190	-79.571	3	R1	6
67 Ridge and Valley	CDR043.01	Cedar Creek	Valley	67b	Shenandoah	38.983	-78.525	2	R3	1
67 Ridge and Valley	CFP003.94	Calfpasture River	Valley	67c	Rockbridge	37.978	-79.495	4	R2	3
67 Ridge and Valley	CPL018.37	Cripple Creek	Southwest	67g	Wythe	36.815	-81.130	4	R3	3
67 Ridge and Valley	CWP042.06	Cowpasture River	Valley	67b	Bath	38.014	-79.641	3	R2	1
67 Ridge and Valley	CWP050.66	Cowpasture River	Valley	67b	Bath	38.078	-79.659	4	R1	3
67 Ridge and Valley	IDI003.67	Indian Creek	Southwest	67f	Tazewell	37.112	-81.724	3	R1	2
67 Ridge and Valley	IND010.25	Indian Creek	Southwest	67f	Lee	36.592	-83.566	4	R2	5
67 Ridge and Valley	JKS030.65	Jackson River	W Central	67g	Alleghany	37.842	-79.989	4	R3	10
67 Ridge and Valley	JKS067.00	Jackson River	Valley	67c	Bath	38.105	-79.814	3	R1	4
67 Ridge and Valley	JKS087.13	Jackson River	Valley	67c	Highland	38.299	-79.660	2	R1	1
67 Ridge and Valley	JOB001.17	Johns Creek	W Central	67b	Craig	37.503	-80.120	4	R3	2
67 Ridge and Valley	KBL007.24	Kimberling Creek	Southwest	67g	Bland	37.166	-80.940	4	R1	2
67 Ridge and Valley	LAC000.92	Laurel Creek	Southwest	67h	Bland	37.247	-81.111	3	R3	4
67 Ridge and Valley	LAE013.29	Laurel Creek	Southwest	67h	Tazewell	37.033	-81.477	3	R2	1
67 Ridge and Valley	LIB003.65	Lick Creek	Southwest	67h	Smyth	36.978	-81.457	3	R2	1
67 Ridge and Valley	LTB007.76	Little Back Creek	Valley	67d	Bath	38.179	-79.878	3	R3	3
67 Ridge and Valley	MFH032.39	M.F.Holston	Southwest	67f	Smyth	36.812	-81.620	4	R1	1
67 Ridge and Valley	NBF002.52	North Buffalo Creek	Valley	67a	Rockbridge	37.721	-79.607	2	R1	1
67 Ridge and Valley	NFH098.47	N.F. Holston	Southwest	67f	Smyth	36.923	-81.624	4	R1	5
67 Ridge and Valley	NFS102.20	N F Shenandoah R	Valley	67a	Rockingham	38.316	-78.819	4	R1	4
67 Ridge and Valley	PKC011.11	Peak Creek	W Central	67f	Pulaski	37.046	-80.793	2	R1	9
67 Ridge and Valley	POT030.66	Potts Creek	W Central	67h	Craig	37.601	-80.219	3	R1	5
67 Ridge and Valley	PSG031.99	Passage Creek	Valley	67c	Page	38.732	-78.528	2	R1	6

Table A-1 (Continued).

Ecoregion		StationID	Stream Name	DEQ Region	Sub num	County	Lat (dd)	Long (dd)	Stream Order	Ref Type	No. Samples
67	Ridge and Valley	RDC044.87	Reed Creek	Southwest	67f	Wythe	36.945	-81.244	4	R2	1
67	Ridge and Valley	ROA224.54	Roanoke River	W Central	67f	Roanoke	37.246	-80.175	4	R1	7
67	Ridge and Valley	SMK001.73	Shoemaker River	Valley	67b	Rockingham	38.603	-78.933	3	R2	1
67	Ridge and Valley	SNC005.04	Stony Creek	W Central	67h	Giles	37.400	-80.653	3	R1	9
67	Ridge and Valley	SNK012.06	Sinking Creek	W Central	67f	Giles	37.304	-80.487	3	R1	8
67	Ridge and Valley	SNY000.23	Stoney Creek	Southwest	67f	Scott	36.773	-82.578	4	R1	5
67	Ridge and Valley	SOA001.00	South Branch Potomac	Valley	67c	Highland	38.482	-79.509	2	R1	1
67	Ridge and Valley	STC004.27	Strait Creek	Valley	67c	Highland	38.436	-79.532	1	R1	8
67	Ridge and Valley	STY006.73	Stony Creek	Valley	67a	Shenandoah	38.870	-78.631	3	R1	7
67	Ridge and Valley	WAL001.57	Wallen Creek	Southwest	67f	Lee	36.622	-83.185	4	R1	4
67	Ridge and Valley	WFC000.20	Wolf Creek	W Central	67f	Giles	37.352	-80.696	4	R2	1
67	Ridge and Valley	WFC003.69	Wolf Creek	W Central	67h	Giles	37.306	-80.849	3	R1	3
67	Ridge and Valley	WFC034.82	Wolf Creek	Southwest	67h	Bland	37.180	-81.191	4	R3	4
69	Central Appalachians	CAL000.03	Callahan Creek	Southwest	69d	Wise	36.906	-82.782	4	R2	2
69	Central Appalachians	DIS017.94	Dismal Creek	Southwest	69d	Buchanan	37.236	-81.856	3	R3	3
69	Central Appalachians	DRK036.38	Dry Fork	Southwest	69d	Tazewell	37.184	-81.630	2	R2	2
69	Central Appalachians	GRN000.06	Greendale Creek	Southwest	69d	Washington	36.774	-82.071	3	R2	1
69	Central Appalachians	HAP000.63	Horsepen Creek	Southwest	69d	Tazewell	37.209	-81.554	3	R2	1

Table A-2. Legend key and parameter definitions for Table A-3 and Figure A-1: Percentage land use/land cover in reference sites.

Legend Parameter	Explanation
WOODS43	Mixed forest
WOODS42	Evergreen forest
WOODS41	Deciduous forest
WOODS40*	**Total % of Mixed, Evergreen, and Deciduous forest**
WETL92	Emergent herbaceous wetlands
WETL91	Woody wetlands
WETL90*	**Total % of Emergent herbaceous and Woody wetlands**
URBAN23	Commercial/industrial/transportation
URBAN22	High intensity residential
URBAN21	Low intensity residential
URBAN20*	**Total % of all URBAN land cover types**
H2011*	**Open water**
BARE33	Transitional
BARE32	Quarries/strip mines/gravel pits
BARE31	Bare rocks/sand/clay
BARE30*	**Total % of all BARE land cover types**
AGVEG85	Urban/recreational grasses
AGVEG82	Row crops
AGVEG81	Pasture/hay
AGVEG80*	**Total % of all AGVEG land cover types**
* General categories shown in Figure A-1.	

Table A-3. Percentage land use/land cover in reference sites (sites listed by Level III Ecoregion in same order as in Table A-1). Land cover parameters are defined in Table A-2.

Station ID	WOODS				WETL			URBAN				H2O	BARE				AGVEG			
	41	42	43	40	91	92	90	21	22	23	20	11	31	32	33	30	81	82	85	80
RAP00653	39.36	5.82	16.73	61.92	0.25	0.12	0.37	1.03	0.01	0.07	1.11	0.42	0.00	0.02	0.95	0.97	31.95	3.22	0.04	35.21
RPP13267	36.77	3.79	17.75	58.30	0.06	0.07	0.13	1.54	0.02	0.15	1.70	0.31	0.00	0.01	0.41	0.42	37.12	1.98	0.02	39.13
RSE00987	24.42	7.16	19.80	51.38	6.40	0.33	6.73	1.55	0.00	0.61	2.17	0.99	0.00	0.00	6.80	6.80	25.80	6.13	0.01	31.94
TYE02622	73.98	3.15	12.25	89.37	0.03	0.04	0.06	0.13	0.00	0.00	0.13	0.13	0.00	0.00	0.70	0.70	9.33	0.27	0.00	9.61
CAX00457	15.45	1.01	15.91	32.37	0.51	0.23	0.74	0.55	0.02	0.11	0.68	0.15	0.00	0.00	0.02	0.02	63.04	3.00	0.00	66.04
GOO04436	45.85	0.94	20.04	66.83	0.03	0.01	0.04	0.54	0.00	0.79	1.33	0.08	0.00	0.00	0.19	0.19	31.24	0.28	0.00	31.52
HAZ04243	56.53	15.87	25.75	98.15	0.00	0.01	0.01	0.04	0.00	0.00	0.04	0.01	0.00	0.00	0.02	0.02	1.77	0.00	0.00	1.77
ROB00190	41.93	4.21	19.32	65.46	0.25	0.10	0.35	1.25	0.00	0.04	1.29	0.29	0.00	0.00	0.34	0.34	29.63	2.64	0.00	32.27
ROB02256	66.86	3.85	18.97	89.67	0.19	0.02	0.21	0.32	0.00	0.01	0.33	0.05	0.00	0.00	0.18	0.18	9.14	0.42	0.00	9.56
RPP14710	40.08	3.41	19.71	63.21	0.05	0.05	0.10	1.13	0.00	0.06	1.19	0.21	0.00	0.00	0.16	0.16	33.84	1.26	0.03	35.13
RPP15032	40.60	2.85	18.57	62.02	0.06	0.03	0.09	1.37	0.01	0.10	1.47	0.19	0.00	0.00	0.18	0.18	34.84	1.14	0.06	36.05
GCR00001	74.40	6.96	13.78	95.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	4.52	0.32	0.00	4.84
HTN00920	84.36	8.86	2.40	95.62	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	3.68	0.68	0.00	4.36
MIO00035	78.85	7.20	10.34	96.40	0.00	0.04	0.04	0.01	0.00	0.00	0.01	0.03	0.00	0.00	0.12	0.12	3.22	0.18	0.00	3.40
RDC03383	37.17	7.27	12.60	57.04	0.07	0.03	0.10	0.00	0.02	0.54	0.55	0.00	0.00	0.03	0.23	0.26	39.69	2.27	0.08	42.04
RIC00295	39.49	9.87	15.59	64.95	0.12	0.03	0.14	0.04	0.00	0.00	0.04	0.27	0.00	0.00	0.16	0.16	31.53	2.90	0.00	34.44
RIC03408	36.74	9.54	15.16	61.44	0.17	0.03	0.20	0.01	0.00	0.00	0.02	0.10	0.00	0.00	0.03	0.03	36.52	1.69	0.00	38.21
TYE03271	81.35	3.09	11.17	95.61	0.01	0.03	0.04	0.16	0.00	0.00	0.16	0.06	0.00	0.00	1.05	1.05	2.95	0.13	0.00	3.08
WLC01020	75.16	14.45	6.00	95.60	0.02	0.01	0.03	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.95	0.41	0.00	4.36
BLD00022	56.29	6.44	12.15	74.87	0.00	0.01	0.01	0.23	0.00	0.19	0.42	0.10	0.00	0.00	0.58	0.58	23.50	0.52	0.00	24.02
BLP00079	53.70	8.71	18.78	81.19	0.06	0.10	0.16	0.05	0.00	0.00	0.05	0.10	0.00	0.00	0.45	0.45	17.18	0.87	0.00	18.05
CDR04301	84.36	1.46	11.87	97.69	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.09	0.09	2.06	0.12	0.00	2.19
CFP00394	69.87	7.28	12.78	89.93	0.37	0.16	0.53	0.20	0.00	0.00	0.20	0.28	0.00	0.00	0.15	0.15	8.45	0.47	0.00	8.91
CPL01837	40.13	10.96	15.03	66.12	0.03	0.02	0.05	0.55	0.00	0.05	0.60	0.04	0.00	0.00	0.04	0.04	32.03	1.09	0.02	33.14
CWP04206	58.04	9.72	18.21	85.98	0.09	0.10	0.18	0.03	0.00	0.00	0.03	0.23	0.00	0.00	0.25	0.25	12.49	0.84	0.00	13.32
CWP05066	56.31	10.51	18.32	85.15	0.07	0.11	0.18	0.03	0.00	0.00	0.03	0.25	0.00	0.00	0.27	0.27	13.27	0.86	0.00	14.13
IDI00367	76.28	3.03	11.93	91.24	0.00	0.07	0.07	0.06	0.00	0.00	0.06	0.05	0.00	0.02	0.86	0.89	6.50	1.19	0.00	7.69
IND01025	63.33	12.22	22.78	98.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.67	0.00	0.00	1.67
JKS03065	69.18	4.00	13.02	86.20	0.05	0.05	0.09	0.19	0.00	0.03	0.22	1.24	0.00	0.00	0.41	0.41	10.85	0.95	0.03	11.83
JKS06700	62.99	4.11	13.84	80.94	0.03	0.07	0.10	0.02	0.00	0.00	0.02	0.03	0.00	0.00	0.26	0.26	17.78	0.87	0.00	18.64
JKS08713	51.61	2.83	13.15	67.58	0.01	0.08	0.10	0.03	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.03	30.43	1.80	0.00	32.23
JOB00117	78.31	3.13	12.02	93.46	0.10	0.02	0.12	0.01	0.00	0.00	0.01	0.31	0.00	0.00	0.22	0.22	4.06	1.82	0.00	5.88
KBL00724	59.14	10.17	20.16	89.47	0.01	0.00	0.02	0.02	0.00	0.07	0.09	0.06	0.00	0.00	0.34	0.34	8.78	1.24	0.00	10.02

Table A-3 (continued).

Station ID	WOODS				WETL			URBAN				H2O	BARE				AGVEG			
	41	42	43	40	91	92	90	21	22	23	20	11	31	32	33	30	81	82	85	80
LAC00092	81.49	2.14	9.85	93.48	0.11	0.00	0.11	0.20	0.00	0.18	0.38	0.06	0.00	0.00	1.02	1.02	3.25	1.70	0.00	4.96
LAE01329	70.36	8.13	20.23	98.72	0.30	0.00	0.30	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.75	0.21	0.00	0.96
LIB00365	66.02	10.57	21.35	97.94	0.05	0.04	0.10	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.09	0.09	1.19	0.64	0.00	1.83
LTB00776	80.19	2.49	10.99	93.67	0.00	0.00	0.00	0.00	0.00	0.03	0.03	2.40	0.00	0.00	2.74	2.74	0.32	0.83	0.00	1.15
MFH03239	58.42	7.39	8.57	74.38	0.04	0.03	0.07	2.25	0.04	2.04	4.32	0.13	0.00	0.05	0.13	0.18	19.98	0.79	0.15	20.92
NBF00252	74.29	3.12	7.75	85.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.25	0.25	13.85	0.72	0.00	14.56
NFH09847	52.07	4.41	12.50	68.98	0.05	0.04	0.09	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.03	0.03	28.09	2.59	0.00	30.69
NFS10220	13.19	1.62	3.93	18.74	0.00	0.16	0.16	3.37	0.00	0.07	3.44	0.69	0.00	0.00	0.03	0.03	67.21	8.05	1.68	76.94
PKC01111	53.84	8.54	22.24	84.62	0.03	0.01	0.04	0.26	0.00	0.02	0.28	0.58	0.00	0.00	0.37	0.37	12.41	1.71	0.00	14.12
POT03066	85.05	1.15	5.85	92.05	0.09	0.00	0.09	0.05	0.00	0.00	0.05	0.04	0.00	0.00	0.17	0.17	5.57	2.03	0.00	7.59
PSG03199	79.20	6.06	11.96	97.22	0.06	0.00	0.06	0.15	0.00	0.00	0.15	0.03	0.00	0.00	2.47	2.47	0.07	0.00	0.00	0.07
RDC04487	48.24	8.19	15.65	72.08	0.14	0.03	0.17	0.64	0.01	0.22	0.87	0.01	0.00	0.00	0.22	0.22	24.58	2.02	0.04	26.64
ROA22454	58.39	6.19	13.32	77.90	0.04	0.04	0.08	1.40	0.00	1.01	2.41	0.09	0.00	0.18	0.37	0.55	16.24	2.72	0.01	18.97
SMK00173	81.98	2.04	13.65	97.66	0.01	0.01	0.02	0.32	0.00	0.02	0.33	0.14	0.00	0.00	0.04	0.04	1.70	0.11	0.00	1.80
SNC00504	84.17	4.87	10.25	99.29	0.25	0.00	0.25	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.06	0.06	0.26	0.10	0.00	0.36
SNK01206	53.73	1.29	7.10	62.12	0.04	0.02	0.06	0.01	0.00	0.00	0.01	0.04	0.00	0.00	0.10	0.10	32.05	5.62	0.00	37.67
SNY00023	84.85	7.95	5.24	98.04	0.10	0.00	0.10	0.12	0.00	0.00	0.13	0.03	0.00	0.00	0.07	0.07	1.58	0.06	0.00	1.64
SOA00100	37.08	1.41	4.91	43.40	0.01	0.03	0.04	0.11	0.00	0.00	0.11	0.03	0.00	0.00	0.03	0.03	55.43	0.96	0.00	56.39
STC00427	50.73	8.59	14.09	73.41	0.14	0.13	0.27	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.04	0.04	24.64	1.63	0.00	26.28
STY00673	70.40	3.56	14.60	88.56	0.02	0.01	0.03	0.86	0.00	0.04	0.90	0.20	0.00	0.00	0.28	0.28	9.37	0.66	0.00	10.03
WAL00157	70.98	8.09	6.93	85.99	0.03	0.00	0.04	0.09	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	13.25	0.63	0.00	13.88
WFC00020	84.47	3.88	9.26	97.61	0.18	0.00	0.18	0.19	0.00	0.29	0.48	0.07	0.00	0.00	0.31	0.32	1.04	0.30	0.00	1.35
WFC00369	61.97	5.38	12.60	79.95	0.09	0.06	0.14	0.10	0.00	0.28	0.39	0.07	0.00	0.02	0.33	0.35	17.22	1.87	0.00	19.10
WFC03482	47.14	2.58	10.48	60.20	0.14	0.12	0.26	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.04	0.04	36.55	2.80	0.00	39.35
CAL00003	85.66	2.03	7.57	95.25	0.00	0.05	0.06	0.23	0.00	0.27	0.50	0.21	0.00	1.75	1.39	3.14	0.52	0.33	0.00	0.84
DIS01794	86.36	0.83	10.18	97.37	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.45	1.52	1.97	0.62	0.00	0.00	0.63
DRK03638	77.92	2.62	10.89	91.44	0.00	0.00	0.01	0.12	0.00	0.01	0.13	0.04	0.00	0.02	0.68	0.70	6.62	1.06	0.00	7.68
GRN00006	57.15	14.51	5.32	76.99	0.03	0.03	0.05	0.58	0.00	0.10	0.67	0.00	0.00	0.01	0.00	0.01	21.72	0.49	0.07	22.28
HAP00063	75.76	2.25	13.28	91.29	0.00	0.00	0.00	0.11	0.00	0.21	0.33	0.19	0.00	0.54	1.90	2.44	4.86	0.89	0.00	5.75

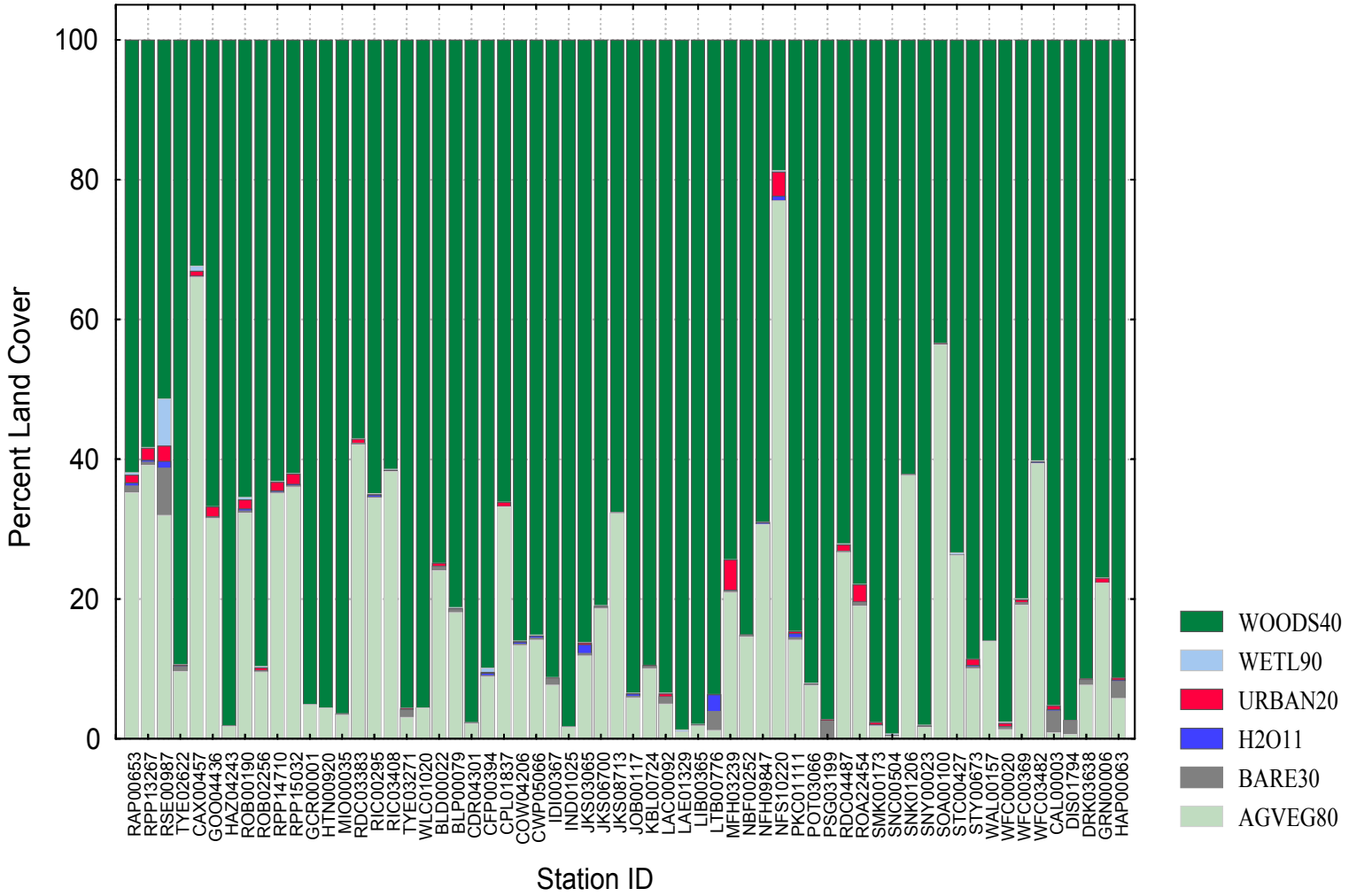

Figure A-1. Percentage land use/land cover in reference sites. Sites are grouped by Level III Ecoregion and listed in the same order as in Table A-1. Land cover parameters are defined in Table A-2.

Table A-4. Reference sites used for testing/validation of the Virginia Stream Condition Index (SCI), 1999-2002 data set. Reference sites (n=82) used in testing the Virginia Stream Condition Index, grouped by Level III Ecoregion. "RefType" indicates 28 (of 62) reference sites from the index development phase of the project whose additional 1999-2002 samples were used in the testing phase (see Table A-1 for all previous reference sites and for R1, R2, R3 key). The additional 34 original reference sites (Table A-1) were not sampled after 1998, and the additional 54 validation reference sites (this table) were sampled only in the post-1998 data set.

	Ecoregion	StationID	Stream Name	DEQ Region	County	Lat (dd)	Long (dd)	Stream Order	No. Samples	Ref Type
45	Piedmont	CNT001.32	Big Chestnut Creek	W Central	Franklin	36.9258	-79.7506	4	2	
45	Piedmont	COO002.35	Cooper Creek	SCRO	Buckingham	37.5194	-78.5233	1	2	
45	Piedmont	HAZ006.34	Harris Creek	W Central	Amherst	37.4799	-79.1712	3	2	
45	Piedmont	LSD001.23	Long Island Creek	Valley	Fluvanna	37.8451	-78.2296	1	5	
45	Piedmont	RAP006.53	Rapidan River	Northern	Culpeper	38.3594	-77.6861	4	5	R3
45	Piedmont	RAP003.76	Rapidan River	Northern	Culpeper	38.3783	-77.6483	4	1	
45	Piedmont	RPP132.67	Rappahannock River	Northern	Culpeper/Fauq	38.4222	-77.7158	4	2	R2
45	Piedmont	TLR014.44	Taylors Creek	Valley	Louisa	37.8485	-77.8277	1	1	
45	Piedmont	TYE026.22	Tye River	Valley	Nelson	37.7629	-78.9927	3	1	R3
45	Piedmont	XEH001.35	UT to Great Creek	Piedmont	Brunswick	36.7528	-77.8184	1	1	
45	Piedmont	WIC000.40	Wreck Island Creek	W Central	Appomattox	37.5067	-78.8981	3	1	
64	Northern Piedmont	BRC002.70	Beaver Creek	Northern	Orange	38.1660	-78.0488	1	2	
64	Northern Piedmont	CAA008.03	Catharpin Creek	Northern	Prince Wm.	38.8697	-77.6829	2	1	
64	Northern Piedmont	CAX004.57	Catoctin Creek	Northern	Loudoun	39.2550	-77.5767	3	6	R3
64	Northern Piedmont	FIR002.39	Fiery Run	Northern	Fauquier	38.8250	-78.0475	2	1	
64	Northern Piedmont	FIR005.00	Fiery Run	Northern	Fauquier	38.8486	-78.0622	2	2	
64	Northern Piedmont	GOO022.44	Goose Creek	Northern	Loudoun	39.0136	-77.6997		3	
64	Northern Piedmont	HAZ042.43	Hazel River	Northern	Rappahannock	38.6031	-78.2528	2	6	R3
64	Northern Piedmont	KET011.03	Kettle Run	Northern	Fauquier	38.7217	-77.6516	2	1	
64	Northern Piedmont	LUC000.95	Lucky Run	Northern	Prince Wm	38.6118	-77.5231	2	2	
64	Northern Piedmont	NOB007.97	N. Fk. Beaverdam Creek	Northern	Loudoun	39.1039	-77.8031	1	2	
64	Northern Piedmont	RPP147.10	Rappahannock River	Northern	Culpeper/Fauq	38.5300	-77.8139	4	7	R2
64	Northern Piedmont	RPP150.32	Rappahannock River	Northern	Culpeper	38.5828	-77.8758	3	7	R2
64	Northern Piedmont	RPP186.59	Rappahannock River	Northern	Fauquier/Rapp	38.8378	-78.1056	2	1	
64	Northern Piedmont	ROB001.90	Robinson River	Northern	Culpeper	38.3250	-78.0956	3	4	R3
64	Northern Piedmont	ROB022.56	Robinson River	Northern	Madison	38.4572	-78.3019	2	7	R2
64	Northern Piedmont	SOC013.05	S. Fk. Catoctin Creek	Northern	Loudoun	39.1464	-77.7322	2	1	
64	Northern Piedmont	SUM003.88	Summerduck Run	Northern	Culpeper	38.3878	-77.9524	2	1	

Table A-4 (continued).

	Ecoregion	StationID	Stream Name	DEQ Region	County	Lat (dd)	Long (dd)	Stream Order	No. Samples	Ref Type
64	Northern Piedmont	WAC003.31	Wancopin Creek	Northern	Fauquier	38.9721	-77.7268	2	1	
64	Northern Piedmont	XJI000.38	X-Trib to Goose Creek	Northern	Loudoun	38.9000	-78.0375	1	3	
66	Blue Ridge	BDA011.79	Beaverdam Creek	W Central	Bedford	37.2925	-79.7545	2	2	
66	Blue Ridge	BTM000.04	Bottom Creek	W Central	Montgomery	37.1017	-80.2194	3	1	
66	Blue Ridge	BRF019.96	Burks Fork	W Central	Floyd	36.8119	-80.4972	2	1	
66	Blue Ridge	GSE000.71	Goose Creek	W Central	Floyd	37.0975	-80.2147		2	
66	Blue Ridge	GCR000.01	Green Creek	W Central	Franklin	37.0542	-80.0850	1	4	R1
66	Blue Ridge	JNG002.87	Jennings Creek	W Central	Botetourt	37.5292	-79.6242	3	1	
66	Blue Ridge	LIC004.73	Little Indian Creek	W Central	Floyd	36.9386	-80.5380	1	3	
66	Blue Ridge	MIO000.35	Mill Creek	Valley	Nelson	37.8456	-79.1303	2	1	R1
66	Blue Ridge	BNF003.52	N.F. Buffalo River	W Central	Amherst	37.7188	-79.2018	2	2	
66	Blue Ridge	NRT001.14	North Creek	W Central	Botetourt	37.5434	-79.6055	3	1	
66	Blue Ridge	RAP082.43	Rapidan River	Northern	Madison	38.4378	-78.3678	2	7	
66	Blue Ridge	RRW000.14	Rocky Row Run	W Central	Amherst	37.5977	-79.3901	2	1	
66	Blue Ridge	SNO000.35	Snow Creek	W Central	Bedford	37.5889	-79.3854	1	1	
66	Blue Ridge	SMR004.80	St. Marys River	Valley	Augusta	37.9349	-79.0880	2	2	
67	Ridge and Valley	BRU006.73	Brumley Creek	Southwest	Washington	36.8517	-82.0150	4	1	
67	Ridge and Valley	BLD000.22	Buffalo Creek	Valley	Rockbridge	37.6789	-79.4267	3	1	R1
67	Ridge and Valley	BLP000.79	Bullpasture River	Valley	Bath	38.1902	-79.5706	3	4	R1
67	Ridge and Valley	CFP000.02	Calfpasture River	Valley	Rockbridge	37.9495	-79.4599	4	5	
67	Ridge and Valley	CWP053.78	Cowpasture River	Valley	Bath	38.0999	-79.6500		2	
67	Ridge and Valley	CWP050.66	Cowpasture River	Valley	Bath	38.0778	-79.6594	4	8	R1
67	Ridge and Valley	CRG074.47	Craig Creek	W Central	Montgomery	37.3347	-80.3314	1	3	
67	Ridge and Valley	JKS030.65	Jackson River	W Central	Alleghany	37.8417	-79.9889	4	6	R3
67	Ridge and Valley	JKS067.00	Jackson River	Valley	Bath	38.1050	-79.8139	3	3	R1
67	Ridge and Valley	JOB001.17	Johns Creek	W Central	Craig	37.5031	-80.1203	4	4	R3
67	Ridge and Valley	JOB001.02	Johns Creek	W Central	Craig	37.5030	-80.1150	4	2	
67	Ridge and Valley	LIB003.65	Lick Creek	Southwest	Smyth	36.9778	-81.4572	3	1	R2
67	Ridge and Valley	LRY004.64	Little Stony Creek	W Central	Giles	37.3525	-80.5983	3	2	
67	Ridge and Valley	LWK000.77	Little Walker Creek	W Central	Pulaski	37.1964	-80.7334		1	
67	Ridge and Valley	NFS102.20	N F Shenandoah R	Valley	Rockingham	38.3161	-78.8186	4	2	R1
67	Ridge and Valley	OGL005.53	Ogle Creek	W Central	Alleghany	37.8399	-80.1225	2	2	
67	Ridge and Valley	PSG031.99	Passage Creek	Valley	Page	38.7317	-78.5278	2	4	R1
67	Ridge and Valley	PSG030.24	Passage Creek	Valley	Warren	38.7420	-78.5138	2	5	
67	Ridge and Valley	PKC011.11	Peak Creek	W Central	Pulaski	37.0458	-80.7928	2	3	R1

Table A-4 (continued).

	Ecoregion	StationID	Stream Name	DEQ Region	County	Lat (dd)	Long (dd)	Stream Order	No. Samples	Ref Type
67	Ridge and Valley	POT030.66	Potts Creek	W Central	Craig	37.6008	-80.2186	3	5	R1
67	Ridge and Valley	PMC000.73	Pounding Mill Creek	W Central	Alleghany	37.7807	-79.9626	2	1	
67	Ridge and Valley	ROA224.54	Roanoke River	W Central	Roanoke	37.2461	-80.1753	4	5	R1
67	Ridge and Valley	SNK012.06	Sinking Creek	W Central	Giles	37.3039	-80.4869	3	4	R1
67	Ridge and Valley	SOA001.00	South Branch Potomac	Valley	Highland	38.4822	-79.5094	2	3	R1
67	Ridge and Valley	SNY005.68	Stoney Creek	Southwest	Scott	36.8267	-82.6086	4	1	
67	Ridge and Valley	SNC005.04	Stony Creek	W Central	Giles	37.4000	-80.6533	3	4	R1
67	Ridge and Valley	STC004.27	Strait Creek	Valley	Highland	38.4358	-79.5319	1	8	R1
67	Ridge and Valley	WLN009.07	Wilson Creek	Valley	Bath	37.9167	-79.7956	3	1	
67	Ridge and Valley	WLN010.35	Wilson Creek	Valley	Bath	37.9358	-79.7819	3	1	
67	Ridge and Valley	WFC003.69	Wolf Creek	W Central	Giles	37.3056	-80.8494	3	1	R1
67	Ridge and Valley	WFC010.66	Wolf Creek	W Central	Giles	37.2789	-80.9254	4	2	
67	Ridge and Valley	WFC044.15	Wolf Creek	Southwest	Bland	37.1483	-81.2886	4	2	
67	Ridge and Valley	WOL000.39	Wolf Creek	Southwest	Washington	36.8275	-81.9253	4	1	
67	Ridge and Valley	XED000.02	X Trib Poor Creek	Valley	Rockbridge	37.9504	-79.2809	1	1	
67	Ridge and Valley	XDJ000.15	X-trib to Falls Creek	Southwest	Scott	36.8067	-82.4447	2	2	
67	Ridge and Valley	XCH001.34	X-trib to N.F. Holston River	Southwest	Washington	36.7689	-82.1911	1	1	
69	Central Appalachians	ADR000.13	Adair Run	W Central	Giles	37.3738	-80.8698	3	1	
69	Central Appalachians	PLL000.17	Phillips Creek	Southwest	Wise	37.1167	-82.6667	2	1	

APPENDIX B

REFERENCE SAMPLE PHYSICAL HABITAT AND FIELD CHEMISTRY

(INDEX DEVELOPMENT, 1994-1998 DATA)

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Table B-1. Water quality and physical habitat data for independent samples (n=247) collected in 62 reference sites, 1994-1998, listed in order by Level III Ecoregion, then by Station ID and sampling date. Missing data are indicated by -9999.

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
45	45e	RAP006.53	RAP185	4/28/94	70	9.4	7.3	22.1	188	16	12	15	18	14	17	15	17	14	15	19	16
45	45e	RAP006.53	RAP181	9/7/94	63	9.5	8.2	20.6	188	16	12	15	18	14	17	15	17	14	15	19	16
45	45e	RAP006.53	RAP338	4/20/95	79	10.8	7.7	19.1	199	16	16	16	18	14	17	17	16	18	16	19	16
45	45e	RAP006.53	RAP455	9/11/95	102	10.3	7.6	24.3	205	17	16	16	20	16	17	17	16	18	16	19	17
45	45e	RAP006.53	RAP595	5/10/96	70	11.9	7.3	15.9	217	18	17	19	19	17	19	18	16	20	17	19	18
45	45e	RAP006.53	RAP660	10/29/96	93	10.6	7.3	14.8	203	16	16	16	19	17	18	16	16	16	16	19	18
45	45e	RAP006.53	RAP918	4/17/97	81	11.1	7.6	14	209	17	17	17	19	17	18	17	16	18	17	18	18
45	45e	RAP006.53	RAP930	9/2/97	103	12.3	8	28.4	209	18	17	17	18	17	19	17	17	16	17	18	18
45	45e	RAP006.53	RAP1233	6/30/98	76	8.2	7.6	27.5	203	17	17	17	18	16	20	16	15	15	16	17	19
45	45e	RAP006.53	RAP1259	9/14/98	77	10	8.4	24.8	210	18	16	17	18	18	19	17	16	17	17	18	19
45	45e	RPP132.67	RPP923	5/7/97	85	11	7.8	19.3	222	19	18	18	20	16	20	17	19	19	17	20	19
45	45e	RPP132.67	RPP944	8/18/97	130	9.7	7.7	24.9	217	17	17	18	19	17	19	18	18	18	17	20	19
45	45e	RPP132.67	RPP1228	7/16/98	77	7.6	7.9	26.6	217	19	18	17	18	17	20	17	19	17	18	19	18
45	45e	RPP132.67	RPP1260	9/9/98	133	7.9	7.9	22.3	214	18	18	18	19	17	18	17	18	17	17	18	19
45	45f	RSE009.87	RSE144	11/14/94	65	9.8	6.8	10	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45f	RSE009.87	RSE323	5/5/95	55	8.9	7.3	13.5	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45f	RSE009.87	RSE727	10/25/96	80	9.9	6.9	15	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45f	RSE009.87	RSE840	5/30/97	125	9.5	6.8	18	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45f	RSE009.87	RSE1130	11/18/97	65	10	6.5	11	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45f	RSE009.87	RSE1239	5/15/98	100	6.5	6.5	18	134	18	11	12	10	9	8	14	8	15	12	9	8
45	45e	TYE026.22	TYE579	5/22/96	25	10	6.2	18.4	178	18	12	16	12	14	20	18	16	8	16	14	14
45	45e	TYE026.22	TYE1001	10/20/97	25	10.9	7.4	12.7	164	16	14	16	12	12	16	18	14	8	12	14	12

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
64	64c	CAX004.57	CAX177	9/20/94	184	9.7	7.5	18.4	203	18	16	16	18	18	17	17	16	16	16	18	17
64	64c	CAX004.57	CAX340	4/25/95	160	10.9	7.3	12.3	214	19	18	18	18	17	18	17	18	19	17	18	17
64	64c	CAX004.57	CAX467	10/11/95	187	9	7.3	16.8	214	19	19	19	18	17	18	16	18	17	17	18	18
64	64c	CAX004.57	CAX590	5/21/96	153	10.7	6	23.7	219	19	19	18	18	18	19	17	19	18	18	18	18
64	64c	CAX004.57	CAX657	10/24/96	149	10.8	6.9	12.7	214	18	18	19	18	18	18	18	17	19	16	18	17
64	64c	CAX004.57	CAX909	4/4/97	151	13.2	7.3	16.3	215	19	17	17	18	18	19	17	18	17	18	18	19
64	64c	CAX004.57	CAX946	10/1/97	178	11.1	7.5	16.6	211	19	18	18	17	17	18	17	17	17	17	19	17
64	64c	CAX004.57	CAX1214	5/26/98	146	1.4	8	20.6	204	17	17	17	17	16	18	17	17	17	16	17	18
64	64c	CAX004.57	CAX1280	11/2/98	176	8.8	7.3	10.8	210	18	17	18	18	19	18	16	17	17	18	18	16
64	64c	GOO044.36	GOO178	10/3/94	168	12.8	7.9	15.2	194	16	16	16	16	16	18	16	17	15	16	17	15
64	64c	GOO044.36	GOO352	5/18/95	94	9.2	7.2	18.6	213	17	18	19	18	17	17	17	18	17	18	19	18
64	64c	GOO044.36	GOO463	9/28/95	158	9.9	7.9	14.4	210	16	18	18	17	17	18	17	18	19	17	18	17
64	64c	GOO044.36	GOO589	5/20/96	124	12.6	6.3	19.3	219	19	19	19	18	17	18	18	18	18	19	18	18
64	64c	GOO044.36	GOO663	11/18/96	117	12.6	8.2	8.1	208	18	17	17	17	17	18	17	17	17	17	18	18
64	64c	HAZ042.43	HAZ174	11/9/94	36	10.8	7.4	13.3	220	19	19	20	18	15	18	18	20	17	19	18	19
64	64c	HAZ042.43	HAZ344	5/1/95	35	10.7	7.4	12.9	228	20	20	20	18	17	18	19	20	20	20	18	18
64	64c	HAZ042.43	HAZ458	11/21/95	34	11.9	7.8	6.6	218	17	20	20	18	17	19	19	20	20	19	10	19
64	64c	HAZ042.43	HAZ592	5/24/96	35	11.9	7.1	17.1	229	20	20	20	18	17	18	19	20	20	20	19	18
64	64c	HAZ042.43	HAZ655	10/22/96	39	11.8	6.9	10.4	231	20	20	20	19	17	19	19	20	19	20	18	20
64	64c	HAZ042.43	HAZ903	3/13/97	39	13	7.2	6.7	228	20	20	18	19	17	19	19	20	18	20	18	20
64	64c	HAZ042.43	HAZ940	10/19/97	48	13.2	7	12.3	227	19	20	20	18	17	20	18	20	19	18	19	19
64	64c	HAZ042.43	HAZ1227	4/2/98	26	9.9	7.7	14.3	229	19	20	20	19	17	20	18	20	19	20	18	19
64	64c	HAZ042.43	HAZ1275	11/17/98	30	11.5	6.5	9	223	19	19	20	18	17	18	18	20	18	19	19	18
64	64a	ROB001.90	ROB165	10/17/94	7.2	11.8	7.1	13.5	174	17	16	16	16	11	16	15	8	14	18	15	12
64	64a	ROB001.90	ROB346	5/16/95	61	8.8	8	19.3	204	19	18	17	18	16	17	16	15	16	18	18	16
64	64a	ROB001.90	ROB466	10/2/95	78	9.4	7.3	19.6	201	15	17	17	18	16	18	17	14	17	16	18	18
64	64a	ROB001.90	ROB586	5/16/96	65	12.4	6.6	15.3	213	18	17	18	19	16	19	17	16	18	18	19	18

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
64	64a	ROB001.90	ROB667	11/26/96	66	13.3	7.2	4.2	204	17	17	18	17	17	18	16	15	17	17	19	16
64	64a	ROB001.90	ROB915	4/7/97	67	10.8	7.5	17.8	190	16	16	16	16	15	18	15	16	14	15	15	18
64	64a	ROB001.90	ROB933	10/6/97	78	10.9	7.4	19.7	221	18	19	18	19	19	20	18	17	18	18	19	18
64	64a	ROB001.90	ROB1213	5/28/98	60	9.9	7.9	18	211	19	18	17	18	17	20	16	17	15	17	18	19
64	64a	ROB001.90	ROB1258	9/17/98	64	7.2	6.7	24.4	214	18	18	18	18	19	19	17	17	16	17	19	18
64	64c	ROB022.56	ROB173	10/17/94	42	12.5	6.8	15.3	217	18	18	18	19	17	18	17	20	18	18	18	18
64	64c	ROB022.56	ROB341	5/5/95	43	10.8	7	12.6	229	19	19	19	19	19	19	17	20	19	19	20	20
64	64c	ROB022.56	ROB452	10/20/95	55	10.8	7.5	17.8	213	16	17	18	17	18	18	17	20	18	16	18	20
64	64c	ROB022.56	ROB588	5/16/96	45	13.8	6.6	13.3	226	18	19	20	19	18	19	17	20	18	19	19	20
64	64c	ROB022.56	ROB656	10/22/96	57	11.4	7.1	10.8	208	14	17	17	18	19	19	12	20	17	17	19	19
64	64c	ROB022.56	ROB922	4/30/97	46	10.4	7.1	19.3	209	15	16	18	18	19	18	15	19	18	17	18	18
64	64c	ROB022.56	ROB939	10/19/97	57	12.9	7	14.1	218	17	19	18	19	20	18	17	18	17	17	19	19
64	64c	ROB022.56	ROB1226	3/31/98	34	10.1	8	18.3	208	15	17	17	18	17	18	15	19	17	17	18	20
64	64c	ROB022.56	ROB1267	10/13/98	44	9.8	8.9	20.8	212	16	18	18	18	19	18	16	19	17	17	18	18
64	64a	RPP147.10	RPP914	5/12/97	79	10.8	7.3	18	218	19	15	18	20	18	19	17	16	18	18	20	20
64	64a	RPP147.10	RPP943	8/18/97	109	8.4	7.6	23.8	219	19	18	19	18	18	19	18	16	18	18	20	18
64	64a	RPP147.10	RPP1216	6/30/98	78	8.2	7.7	23.9	211	18	16	17	18	17	20	17	16	17	17	19	19
64	64a	RPP147.10	RPP1257	9/21/98	101	9.9	7.5	26.2	213	19	16	17	19	17	20	17	16	17	17	20	18
64	64c	RPP150.32	RPP951	8/18/97	163	9	7.5	23.5	215	18	18	19	17	19	18	17	16	18	18	19	18
64	64c	RPP150.32	RPP1236	6/30/98	94	7.9	7.6	23.6	208	17	17	18	18	16	19	17	16	17	17	18	18
64	64c	RPP150.32	RPP1262	9/23/98	139	8.2	6.8	18.4	212	18	18	18	18	18	17	17	17	17	17	19	18
66	66a	GCR000.01	GCR22	10/25/94	55	9.4	-9999	14.7	197	15	16	17	18	18	16	17	19	9	16	19	17
66	66a	GCR000.01	GCR202	5/18/95	-9999	9.5	8.2	17.6	198	15	16	17	20	17	18	18	19	5	15	20	18
66	66a	GCR000.01	GCR398	11/16/95	-9999	10.6	7.2	10.6	204	16	16	18	20	18	18	18	20	6	16	20	18
66	66a	GCR000.01	GCR530	5/21/96	40	8	8.2	20.3	193	15	16	16	18	18	18	16	19	6	17	19	15
66	66a	GCR000.01	GCR758	1/21/97	60	13	7	3.2	190	15	15	15	18	18	18	16	18	5	17	19	16
66	66a	GCR000.01	GCR879	5/23/97	43.6	9.8	7.1	15.2	188	15	18	18	19	17	18	13	19	4	10	19	18

Table B-1 (continued).

Ecoregion	subregion	Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
66	66a	GCR000.01	GCR1044	10/20/97	101	10	7.8	12.4	195	15	15	17	18	16	15	16	19	10	17	18	19
66	66a	GCR000.01	GCR1157	5/6/98	42	9.5	7.8	14	192	15	17	15	18	19	18	10	20	6	17	19	18
66	66a	GCR000.01	GCR1359	10/26/98	80	9.8	6.3	15.4	165	15	13	15	18	9	10	15	18	10	4	20	18
66	66c	HTN009.20	HEL137	11/29/94	25	12.4	6.8	4.4	187	19	17	18	18	10	13	15	18	10	14	18	17
66	66c	HTN009.20	HTN1108	12/11/97	30	12.5	6.8	3.2	180	18	18	15	16	13	15	17	17	10	12	15	14
66	66c	HTN009.20	HTN1208	6/2/98	30	9.1	6	14.4	199	17	16	17	19	16	18	15	18	15	13	19	16
66	66a	MIO000.35	MIO451	10/18/95	10	9.5	6.4	10.7	184	16	12	10	14	16	16	20	18	16	14	14	18
66	66a	MIO000.35	MIO1319	10/13/98	14	9.9	6.9	13.2	166	20	18	20	-9999	17	8	-9999	20	20	16	19	10
66	66e	RDC033.83	RDC1085	12/16/97	210	14.2	7.3	1.8	151	15	7	15	19	9	18	8	12	7	8	15	18
66	66e	RIC002.95	RIC1111	11/17/97	30	13.4	6.3	3.8	156	18	10	18	15	7	16	12	10	8	12	15	15
66	66c	RIC034.08	BRI136	11/7/94	40	11.4	6.8	10.7	189	18	15	18	18	10	19	19	13	19	9	15	16
66	66c	RIC034.08	RIC514	4/25/96	30	9.7	7.1	14.5	189	18	12	17	18	17	18	17	10	17	14	15	16
66	66a	TYE032.71	TYE92	10/27/94	10	10.1	7.1	7.9	200	16	16	14	16	16	20	20	20	16	18	14	14
66	66c	WLC010.20	WLC135	11/29/94	25	12.8	6.5	4	206	19	15	18	19	14	14	18	18	15	18	19	19
66	66c	WLC010.20	WLC1107	12/11/97	40	12.4	7	3.7	215	19	17	19	19	17	17	19	18	18	18	17	17
66	66c	WLC010.20	WLC1207	6/2/98	30	9.2	6	14.3	211	16	17	18	19	18	18	18	18	17	17	17	18
67	67a	BLD000.22	BLD55	10/4/94	240	9.4	8.6	13.3	179	18	14	14	14	14	15	16	16	16	14	12	16
67	67a	BLD000.22	BLD228	5/25/95	280	10.3	8.2	21.3	190	18	16	16	16	12	20	18	16	16	12	12	18
67	67a	BLD000.22	BLD959	10/2/97	260	11	8.3	15.1	158	12	12	12	14	16	20	18	10	6	12	14	12
67	67a	BLD000.22	BLD1302	10/15/98	151	11.7	8.5	11.1	162	16	13	15	-9999	18	17	-9999	14	12	18	19	20
67	67b	BLP000.79	BLP56	10/11/94	125	11.3	7.9	9.9	188	18	16	16	14	18	18	14	14	12	16	16	16
67	67b	BLP000.79	BLP406	10/26/95	120	11.9	8.6	10.9	196	18	18	18	14	16	20	18	16	8	16	18	16
67	67b	BLP000.79	BLP548	5/20/96	100	10.1	7.4	0	182	14	14	14	14	16	20	18	16	8	14	18	16
67	67b	BLP000.79	BLP790	5/28/97	115	12.2	8.5	15.2	200	16	16	16	16	18	20	18	16	8	18	20	18
67	67b	BLP000.79	BLP1005	9/30/97	140	10.3	8.4	17.2	202	18	18	18	16	16	20	18	16	10	16	18	18
67	67b	BLP000.79	BLP1300	10/7/98	149	9.9	8.1	16	156	16	16	12	-9999	17	17	-9999	19	11	18	16	14
67	67b	CDR043.01	CDR549	5/1/96	75	11.4	8.1	10.9	208	18	16	16	14	18	20	20	18	16	18	18	16

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
67	67c	CFP003.94	CFP88	10/12/94	130	9.8	7	12.3	192	18	16	18	14	14	18	18	16	12	14	16	18
67	67c	CFP003.94	CFP229	5/10/95	60	9.7	7.4	14.9	206	18	18	18	14	18	20	18	16	12	18	18	18
67	67c	CFP003.94	CFP407	10/17/95	110	10.2	7.7	15.2	184	18	16	16	12	18	14	18	12	10	16	18	16
67	67g	CPL018.37	CRI120	10/24/94	220	11.7	7.6	14.2	197	19	11	18	19	14	17	15	18	15	14	19	18
67	67g	CPL018.37	CPL515	4/25/96	170	11.1	8.3	14.2	176	18	10	17	17	9	18	13	16	12	12	16	18
67	67g	CPL018.37	CPL1110	12/16/97	150	14	7.3	3.5	174	19	10	18	19	12	15	15	16	10	10	15	15
67	67b	CWP042.06	COW86	10/24/94	140	10.3	7.3	12.2	196	18	16	18	16	16	18	18	16	12	16	16	16
67	67b	CWP050.66	CWP233	5/24/95	105	8.9	7.4	16.5	196	18	14	12	16	16	18	18	16	16	16	18	18
67	67b	CWP050.66	CWP412	10/26/95	120	11.6	8.5	12.6	196	18	14	14	16	16	18	18	16	14	16	18	18
67	67b	CWP050.66	CWP1315	10/7/98	158	9.3	8	15.6	156	16	14	16	-9999	17	17	-9999	12	11	16	19	18
67	67f	IDI003.67	IDI1079	10/30/97	240	10.8	7.4	8	173	17	16	19	18	11	14	17	12	18	12	9	10
67	67f	IDI003.67	IDI1189	6/22/98	210	9.6	7.9	20.7	196	19	14	18	14	16	18	16	17	17	15	17	15
67	67f	IND010.25	IND298	4/19/95	250	10.5	7.5	19	176	19	10	18	11	10	15	15	16	15	16	13	18
67	67f	IND010.25	IND360	10/17/95	280	11.2	7.1	12.7	166	19	11	18	12	11	18	12	12	13	12	14	14
67	67f	IND010.25	IND771	4/15/97	200	11.3	8.3	12.5	175	18	12	17	16	12	18	9	17	11	16	14	15
67	67f	IND010.25	IND1092	12/17/97	220	-9999	7.7	2.8	160	17	7	17	17	12	13	12	16	9	12	14	14
67	67f	IND010.25	IND1199	6/18/98	265	9	7.6	18.7	157	18	8	18	15	9	19	12	11	10	10	10	17
67	67g	JKS030.65	JKS1	11/3/94	280	10.6	8.2	11.8	210	16	16	16	20	18	18	17	19	12	18	20	20
67	67g	JKS030.65	JKS191	5/23/95	-9999	9.3	8.2	15.1	215	15	16	17	20	20	18	17	18	18	18	19	19
67	67g	JKS030.65	JKS372	12/4/95	-9999	11.1	6.9	10.8	219	15	18	19	19	18	19	19	19	16	19	19	19
67	67g	JKS030.65	JKS525	5/13/96	100	9.9	6.6	11.6	200	15	13	15	19	19	18	18	18	8	17	20	20
67	67g	JKS030.65	JKS734	11/6/96	160	9.7	8.8	13.1	201	15	15	15	19	19	18	18	18	9	17	19	19
67	67g	JKS030.65	JKS860	5/12/97	128.7	10.7	8.1	15.2	209	15	17	17	17	18	18	17	17	18	18	18	19
67	67g	JKS030.65	JKS862	6/20/97	177.2	9.2	8.3	19.4	204	16	17	17	18	17	18	17	15	15	18	18	18
67	67g	JKS030.65	JKS1027	10/7/97	189	9.1	8.6	15.2	200	15	17	17	18	17	18	16	15	14	17	18	18
67	67g	JKS030.65	JKS1180	6/1/98	183	10.1	8	13.9	214	17	17	18	19	18	18	18	18	15	18	19	19
67	67g	JKS030.65	JKS1330	11/24/98	219	10.6	8.5	11.4	212	15	15	18	18	20	18	19	20	15	19	20	15

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
67	67c	JKS067.00	JKS61	10/24/94	145	10.2	7.5	12.9	192	18	16	14	14	16	18	18	16	12	18	16	16
67	67c	JKS067.00	JKS237	5/24/95	130	9.5	7.9	17.3	202	18	16	16	16	18	20	18	16	14	16	18	16
67	67c	JKS067.00	JKS971	10/6/97	160	9.8	8.4	19.6	168	14	14	12	14	16	20	10	16	4	16	16	16
67	67c	JKS067.00	JKS1311	10/7/98	80	9.3	8.1	16.3	164	15	17	18	-9999	18	16	-9999	17	15	18	16	16
67	67c	JKS087.13	JKS553	4/3/96	95	12.9	8.8	11.3	166	16	14	12	14	16	20	8	16	4	14	16	16
67	67b	JOB001.17	JOB1186	6/3/98	62.6	9	7.8	21.4	197	15	16	16	19	17	18	18	18	5	17	19	19
67	67b	JOB001.17	JOB1360	11/20/98	150	9.8	8.6	10	211	18	15	17	20	19	16	18	20	18	19	16	15
67	67g	KBL007.24	KBL1084	11/18/97	70	12.8	6.5	3.4	156	19	11	18	17	7	17	8	16	7	7	14	15
67	67g	KBL007.24	KBL1193	4/28/98	40	11.2	6.6	12	139	17	7	14	15	9	19	7	7	8	9	13	14
67	67h	LAC000.92	LAU114	10/4/94	120	8.9	6.3	14.2	165	18	7	13	18	13	11	17	18	7	14	16	13
67	67h	LAC000.92	LAC489	5/23/96	50	9.5	8.4	14.4	179	18	9	15	19	17	18	9	17	8	16	15	18
67	67h	LAC000.92	LAC648	10/25/96	90	10.3	7.1	12.8	184	15	10	18	19	17	17	14	18	12	17	17	10
67	67h	LAC000.92	LAC1187	5/19/98	60	8.9	6.8	16.2	170	15	17	18	18	9	18	11	16	8	7	17	16
67	67h	LAE013.29	LAE491	6/18/96	60	8.1	6.8	19.2	173	19	9	18	16	11	13	18	14	19	11	15	10
67	67h	LIB003.65	LIB492	6/18/96	50	8.7	7	20.9	177	18	11	19	14	6	18	18	18	18	15	13	9
67	67d	LTB007.76	LTB63	10/24/94	170	9.6	7.6	13.8	200	20	16	16	16	18	18	16	18	10	18	18	16
67	67d	LTB007.76	LTB241	5/24/95	75	10.4	7.4	16	204	18	18	16	14	18	18	18	18	14	18	18	16
67	67d	LTB007.76	LTB977	10/6/97	120	8.9	7.7	15.9	196	18	16	14	16	18	18	16	18	10	18	18	16
67	67f	MFH032.39	MFH1088	10/23/97	210	11.8	7.6	8.2	154	15	12	18	17	9	15	14	7	8	7	15	17
67	67a	NBF002.52	NBF563	5/2/96	160	10.4	7.8	15.5	155	16	12	10	16	14	18	6	16	-9999	16	16	16
67	67f	NFH098.47	NFH292	4/11/95	200	10.2	6.6	17	181	19	14	18	15	9	14	17	19	15	8	15	18
67	67f	NFH098.47	NFH356	11/27/95	150	13.8	7.9	6.4	192	19	15	19	14	11	18	15	18	15	12	18	18
67	67f	NFH098.47	NFH768	5/22/97	200	10.2	8.8	16.1	189	15	17	18	18	10	18	17	16	15	12	16	17
67	67f	NFH098.47	NFH1089	10/7/97	250	10.5	7.9	18	161	13	11	18	19	8	11	17	16	15	8	15	10
67	67f	NFH098.47	NFH1201	6/29/98	265	8.7	8.1	22.1	170	12	15	18	18	10	17	17	13	15	8	12	15
67	67a	NFS102.20	NFS235	5/22/95	30	10.4	6.8	13.9	206	18	18	16	16	18	20	18	16	14	18	18	16
67	67a	NFS102.20	NFS431	10/30/95	80	11.5	7.4	10.3	186	18	14	14	14	16	18	16	16	10	16	16	18

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
67	67a	NFS102.20	NFS564	4/23/96	45	14.4	9.1	9.3	186	18	14	12	14	16	20	16	16	10	16	16	18
67	67a	NFS102.20	NFS984	9/22/97	100	10.3	8.2	16.9	180	16	16	16	12	16	18	16	16	10	16	16	12
67	67f	PKC011.11	PKC27	10/7/94	30	10.5	-9999	12.7	184	15	14	14	16	17	16	13	17	14	16	17	15
67	67f	PKC011.11	PKC215	5/3/95	-9999	10.6	8.2	12.6	173	15	14	15	18	16	14	14	16	5	11	18	17
67	67f	PKC011.11	PKC377	10/18/95	50	11.5	6.9	11.6	174	15	13	13	18	16	14	14	16	6	16	17	16
67	67f	PKC011.11	PKC527	5/1/96	35	9.8	7.8	13	186	15	15	15	18	18	17	13	18	4	18	18	17
67	67f	PKC011.11	PKC746	10/23/96	100	9.6	7.9	13	180	15	14	14	18	17	18	12	18	3	17	18	16
67	67f	PKC011.11	PKC853	5/1/97	32	10.2	6.2	13.1	193	16	15	13	18	17	18	13	19	8	18	19	19
67	67f	PKC011.11	PKC1036	10/9/97	69	8.9	7.2	15.2	194	17	15	13	18	17	18	13	19	8	18	19	19
67	67f	PKC011.11	PKC1182	4/6/98	53	11.4	-9999	9.2	188	16	15	15	18	17	16	16	18	5	17	18	17
67	67f	PKC011.11	PKC1354	10/13/98	71.5	9.3	8.6	13.8	186	16	14	15	18	16	16	15	16	10	16	17	17
67	67h	POT030.66	POT541	6/4/96	60	9.8	8.2	15.6	177	16	8	10	18	15	18	16	18	3	18	19	18
67	67h	POT030.66	POT760	11/7/96	78	10.3	8.5	14.4	205	16	14	16	18	19	18	17	19	12	18	19	19
67	67h	POT030.66	POT1048	10/22/97	150	-9999	8.4	9	217	17	16	16	20	18	18	16	20	18	19	20	19
67	67h	POT030.66	POT1168	6/3/98	82.4	9.8	7.7	20.4	213	19	14	14	19	19	18	18	19	17	19	18	19
67	67h	POT030.66	POT1362	11/24/98	144	11.4	9.1	8.7	204	17	12	17	20	15	15	18	20	15	18	20	17
67	67c	PSG031.99	PSG48	10/13/94	20	8.8	6.9	11.5	220	20	20	20	18	16	18	20	18	20	16	16	18
67	67c	PSG031.99	PSG257	5/22/95	30	11	7.2	15.9	220	18	18	20	16	18	20	20	20	18	18	16	18
67	67c	PSG031.99	PSG435	10/24/95	25	9.8	6.7	14.5	226	20	18	18	16	18	20	20	20	20	18	18	20
67	67c	PSG031.99	PSG565	5/23/96	25	9.3	6.4	16.8	216	18	18	18	16	16	20	20	18	20	18	18	16
67	67c	PSG031.99	PSG986	9/25/97	30	9.3	7.7	16.5	214	18	18	16	16	18	16	20	20	20	16	18	18
67	67c	PSG031.99	PSG1303	10/19/98	32	10.4	7.3	15.5	183	20	20	20	-9999	20	10	-9999	20	20	20	20	15
67	67f	RDC044.87	REE118	11/14/94	250	15.7	8.1	8.6	176	19	15	15	16	16	15	12	10	11	18	15	14
67	67f	ROA224.54	ROA204	5/4/95	-9999	10.6	8.1	10.9	171	14	13	13	16	13	16	14	15	11	13	16	17
67	67f	ROA224.54	ROA386	10/26/95	180	11.1	-9999	14.5	193	15	16	16	19	15	15	16	16	12	15	18	20
67	67f	ROA224.54	ROA537	5/8/96	140	10.2	6.7	14	186	15	13	14	18	18	18	13	15	10	15	18	19
67	67f	ROA224.54	ROA753	10/16/96	130	8.8	7.8	13	186	15	13	14	18	18	18	13	15	10	15	18	19

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
67	67f	ROA224.54	ROA870	5/8/97	251.5	10.3	8	14.5	188	15	15	16	17	17	18	15	17	8	15	17	18
67	67f	ROA224.54	ROA1161	5/26/98	335	10.4	8.4	21.1	163	11	13	15	17	17	14	10	17	8	8	14	19
67	67f	ROA224.54	ROA1345	11/4/98	484	9.4	6.8	9.6	172	15	13	13	17	16	14	12	16	6	17	17	16
67	67b	SMK001.73	SMK992	9/22/97	75	10.2	8.3	20.3	184	16	16	16	14	16	18	16	14	14	16	16	12
67	67h	SNC005.04	SNC35	10/13/94	60	10.6	-9999	11.4	199	17	15	17	19	18	16	17	20	9	13	20	18
67	67h	SNC005.04	SNC218	5/2/95	-9999	10.8	8.2	10	205	17	16	17	20	17	19	15	20	7	18	19	20
67	67h	SNC005.04	SNC380	11/17/95	-9999	11	-9999	10	203	18	18	16	18	19	18	16	20	6	18	18	18
67	67h	SNC005.04	SNC521	5/2/96	20	11.4	-9999	9.5	207	17	16	16	20	19	18	13	20	10	18	20	20
67	67h	SNC005.04	SNC743	11/5/96	23	11.8	6.3	6.5	197	16	13	13	19	18	18	18	20	6	17	19	20
67	67h	SNC005.04	SNC871	5/6/97	22.4	10.1	6	11.7	185	14	15	18	20	18	15	12	18	-9999	20	20	16
67	67h	SNC005.04	SNC1040	10/14/97	154	9.5	8.5	16.8	184	14	15	18	19	18	15	12	18	1	19	19	16
67	67h	SNC005.04	SNC1178	4/29/98	289	9.5	7.7	11.8	190	17	17	17	18	16	18	16	18	2	15	18	18
67	67h	SNC005.04	SNC1356	11/4/98	63	9.9	8.1	8.2	202	15	16	18	19	18	16	18	20	5	17	20	20
67	67f	SNK012.06	SNK32	10/12/94	180	11.3	7.7	10.4	176	15	14	16	18	18	16	10	18	3	14	18	16
67	67f	SNK012.06	SNK212	5/19/95	-9999	9.1	8.2	16.5	178	15	15	16	17	16	18	10	18	3	13	18	19
67	67f	SNK012.06	SNK379	11/12/95	160	10.4	7.2	11.4	182	15	15	15	18	17	18	13	18	2	16	18	17
67	67f	SNK012.06	SNK536	6/6/96	185	9.8	8.2	20.5	179	15	16	17	19	16	18	8	16	2	15	19	18
67	67f	SNK012.06	SNK749	10/15/96	120	9	7	13	177	15	16	17	19	15	18	8	16	2	15	19	17
67	67f	SNK012.06	SNK875	5/7/97	163.2	10.4	8	13.5	165	15	16	10	16	15	18	10	17	2	11	18	17
67	67f	SNK012.06	SNK1034	10/14/97	250	9.5	8.6	16.2	166	15	16	10	17	15	18	10	17	2	11	18	17
67	67f	SNK012.06	SNK1162	5/21/98	224	9.8	8.2	17.7	172	15	14	15	17	18	18	5	18	5	13	18	16
67	67f	SNY000.23	STN302	3/28/95	60	10.9	6.3	13.3	186	18	11	15	19	17	15	10	17	10	18	19	17
67	67f	SNY000.23	SNY366	12/14/95	57	13.3	6.6	5.3	188	15	14	16	19	17	17	11	16	10	18	18	17
67	67f	SNY000.23	SNY780	5/8/97	55	10.7	7.3	11	173	18	8	9	19	16	18	10	17	11	14	15	18
67	67f	SNY000.23	SNY1091	10/21/97	160	10.8	7	11.1	170	15	10	17	19	14	11	15	16	7	15	16	15
67	67f	SNY000.23	SNY1198	5/14/98	50	9.8	7.5	16.3	202	18	10	17	19	17	19	18	17	18	16	15	18
67	67c	SOA001.00	SOA813	5/21/97	190	10.4	8.7	15.9	160	16	10	8	16	14	18	10	16	6	14	16	16

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
67	67c	STC004.27	STC36	10/11/94	140	10.3	8	10	163	14	14	14	14	16	16	10	18	-9999	16	16	16
67	67c	STC004.27	STC270	5/11/95	130	10.5	8.1	13.1	187	20	16	16	16	16	20	12	20	-9999	16	18	18
67	67c	STC004.27	STC447	10/26/95	120	11.9	7.9	5.5	187	16	16	16	16	16	20	16	20	-9999	16	16	20
67	67c	STC004.27	STC574	5/20/96	145	9.6	8	17.9	171	14	16	14	16	16	20	10	20	-9999	14	16	16
67	67c	STC004.27	STC704	10/17/96	150	10.1	7.3	10.4	184	12	14	12	14	16	20	20	18	12	12	16	18
67	67c	STC004.27	STC816	5/21/97	130	10.2	8.3	12.5	175	16	14	12	16	18	20	10	20	-9999	16	18	16
67	67c	STC004.27	STC995	9/30/97	170	9.4	7.8	12.6	177	16	16	16	18	18	20	6	18	-9999	16	18	16
67	67c	STC004.27	STC1294	10/28/98	152	10.2	8.1	9.8	175	19	20	20	-9999	20	15	-9999	20	14	19	20	10
67	67a	STY006.73	STY54	10/6/94	180	9.8	8.3	13	192	18	16	16	16	18	18	14	14	12	18	16	16
67	67a	STY006.73	STY268	5/9/95	85	10.8	7.9	14.5	200	18	16	14	16	18	20	20	16	10	16	18	18
67	67a	STY006.73	STY444	10/2/95	170	10.1	8.3	15.2	198	18	16	18	14	18	18	18	16	10	18	18	16
67	67a	STY006.73	STY572	5/21/96	100	9	7.2	20	174	10	14	14	12	14	20	18	16	10	14	16	16
67	67a	STY006.73	STY703	10/15/96	95	10.4	7.1	14.6	178	12	12	12	14	18	20	16	16	10	14	18	16
67	67a	STY006.73	STY814	5/27/97	180	11.6	8.7	17.1	188	18	12	12	16	16	20	18	16	14	14	16	16
67	67a	STY006.73	STY997	9/23/97	200	9.8	8	15.3	170	16	10	10	14	18	16	18	16	8	10	18	16
67	67f	WAL001.57	WAL293	4/19/95	235	8.7	8.1	23.1	149	18	14	18	9	9	13	8	17	9	10	8	16
67	67f	WAL001.57	WAL769	4/15/97	190	10.5	8.5	15	184	18	10	15	17	16	16	15	16	15	15	14	17
67	67f	WAL001.57	WAL1093	12/17/97	180	-9999	8	4	165	19	6	17	18	6	15	17	15	15	3	16	18
67	67f	WAL001.57	WAL1196	6/18/98	240	7.4	8	20.2	168	18	10	17	17	9	19	15	13	12	7	13	18
67	67f	WFC000.20	WFC876	5/7/97	120	9.2	8.6	17.3	205	16	15	16	19	19	18	14	18	16	15	20	19
67	67h	WFC003.69	WFC1059	10/23/97	275	10.5	8.5	11.8	206	16	15	16	19	19	18	14	19	16	16	19	19
67	67h	WFC003.69	WFC1166	5/21/98	179	9.5	8.4	21.8	202	15	16	17	19	19	18	16	18	9	17	19	19
67	67h	WFC003.69	WFC1346	10/21/98	227	11.3	8.5	13.2	194	16	16	15	20	18	17	13	18	5	18	20	18
67	67h	WFC034.82	WLF117	10/4/94	170	9.7	6.9	14.5	191	19	14	18	17	17	11	10	18	13	17	19	18
67	67h	WFC034.82	WFC496	5/24/96	110	10.8	8.4	12.3	193	18	16	18	19	10	18	15	16	15	15	15	18
67	67h	WFC034.82	WFC645	10/25/96	140	11.1	7.4	11.1	197	17	16	19	19	12	19	12	18	15	17	18	15
67	67h	WFC034.82	WFC1194	5/19/98	130	9.3	7.1	16.3	197	19	15	18	18	13	19	18	17	18	12	15	15

Table B-1 (continued).

Ecoregion & subregion		Station ID	Benthic Sample ID	Sample date	Water chemistry parameters				Physical habitat parameters (each scored 0-20; possible total=240)												
					conduct	oxygen	pH	temp	tothab	alter	banks	bankveg	cover	embed	flow	graze	riffles	ripveg	sediment	substrate	velocity
69	69d	CAL000.03	CAL295	7/5/95	480	8.7	7.8	25.5	162	17	16	17	8	10	15	14	15	10	14	13	13
69	69d	CAL000.03	CAL358	12/13/95	282	14.6	8.1	4	149	15	11	9	18	8	18	7	17	4	10	17	15
69	69d	DIS017.94	DIS129	12/8/94	250	12.8	8	9	183	17	14	18	19	12	15	14	17	9	17	15	16
69	69d	DIS017.94	DIS501	4/4/96	210	10.4	6.3	13	190	18	13	18	18	15	19	13	17	10	17	17	15
69	69d	DIS017.94	DIS1099	11/12/97	280	11.4	7.1	6.2	161	18	13	18	17	17	10	11	14	5	11	17	10
69	69d	DRK036.38	DRY126	11/14/94	270	12.4	8.2	11.4	183	19	10	18	19	13	13	15	17	15	13	17	14
69	69d	DRK036.38	DRK499	4/24/96	180	10.5	8.5	16.1	164	19	9	18	15	9	18	13	10	14	9	15	15
69	69d	GRN000.06	GRN490	5/20/96	350	8.2	8.1	22	163	15	10	17	12	9	18	11	16	10	13	18	14
69	69d	HAP000.63	HAP504	5/23/96	450	9.5	7.2	14.7	181	19	13	18	17	11	18	14	17	14	11	13	16

APPENDIX C

VIRGINIA DEQ MASTER TAXA LIST, 1994-1998

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Table C-1. Virginia DEQ Master Taxa List, 1994-1998 data. This table lists all unique benthic macroinvertebrate taxa identified from Virginia DEQ biomonitoring samples collected in the 1994-1998 data set used in the index development phase of this report. Organisms were identified to Family taxonomic level where possible ("Final ID" and "Family" columns). Functional Feeding Group (FFG) and Tolerance values (Tol Val) were either supplied by DEQ biologists or were determined by consulting Barbour et al. 1999, Merritt and Cummins 1996, or professional judgement. Taxa are listed in order by Final ID (equivalent to taxonomic Family, in most cases).

FinalID	Order	Family	FFG	Tol Val	Total count (all samples)	Found in Ref sites?	No. Benthic samples where found	Individuals per sample	
								Min	Max
Aeshnidae	Odonata-Anisoptera	Aeshnidae	Predator	3	399	✔	228	1	9
Ancylidae	Basommatophora	Ancylidae	Scraper	6	295	✔	114	1	30
Asellidae	Isopoda	Asellidae	Collector	8	2485	✔	135	1	400
Athericidae	Diptera	Athericidae	Predator	2	607	✔	208	1	18
Atractideidae	Hydracarina	Atractideidae	Predator	5	21	✔	3	1	16
Baetidae	Ephemeroptera	Baetidae	Collector	4	4310	✔	591	1	58
Baetiscidae	Ephemeroptera	Baetiscidae	Collector	3	55	✔	19	1	20
Belostomatidae	Hemiptera	Belostomatidae	Predator	6	1	✔	1	1	1
Blephariceridae	Diptera	Blephariceridae	Scraper	0	402	✔	75	1	60
Brachycentridae	Trichoptera	Brachycentridae	Filterer	1	1058	✔	205	1	39
Branchiobdellidae	Branchiobdellida	Branchiobdellidae	Collector	5	130	✔	40	1	16
Caenidae	Ephemeroptera	Caenidae	Collector	4	231	✔	76	1	18
Calamoceratidae	Trichoptera	Calamoceratidae	Shredder	2	6		1	6	6
Calopterygidae	Odonata-Zygoptera	Calopterygidae	Predator	5	398	✔	177	1	10
Cambaridae	Decapoda-Crayfish	Cambaridae	Shredder	5	845	✔	383	1	17
Capniidae	Plecoptera	Capniidae	Shredder	1	181	✔	36	1	37
Ceratopogonidae	Diptera	Ceratopogonidae	Predator	6	54	✔	28	1	10
Chaoboridae	Diptera	Chaoboridae	Predator	7	37	✔	2	18	19
Chironomidae (A)	Diptera	Chironomidae (A)	Collector	6	12841	✔	989	1	101
Chironomidae (B)	Diptera	Chironomidae (B)	Collector	9	1377	✔	174	1	100
Chloroperlidae	Plecoptera	Chloroperlidae	Predator	1	210	✔	24	1	88
Coenagrionidae	Odonata-Zygoptera	Coenagrionidae	Predator	9	399	✔	179	1	14
Corbiculidae	Unionida	Corbiculidae	Filterer	8	1583	✔	297	1	34
Cordulegastridae	Odonata-Anisoptera	Cordulegastridae	Predator	3	9		3	1	7
Corduliidae	Odonata-Anisoptera	Corduliidae	Predator	5	15	✔	9	1	3
Corixidae	Hemiptera	Corixidae	Predator	5	31	✔	9	1	12
Corydalidae	Megaloptera	Corydalidae	Predator	5	3614	✔	641	1	41
Culicidae	Diptera	Culicidae	Filterer	8	24		5	1	12
Curculionidae	Coleoptera	Curculionidae	Shredder	5	1		1	1	1
Dendrocoelidae	Tricladida	Dendrocoelidae	Predator	8	3		1	3	3
Dryopidae	Coleoptera	Dryopidae	Shredder	5	252	✔	116	1	10
Dytiscidae	Coleoptera	Dytiscidae	Predator	6	34	✔	18	1	6
Elmidae	Coleoptera	Elmidae	Scraper	4	7822	✔	781	1	83
Empididae	Diptera	Empididae	Predator	6	85	✔	46	1	10
Enchytraeidae	Tubificida	Enchytraeidae	Collector	8	8		3	2	3

Table C-1 (continued).

FinalID	Order	Family	FFG	Tol Val	Total count (all samples)	Found in Ref sites?	No. Benthic samples where found	Individuals per sample	
								Min	Max
Ephemerellidae	Ephemeroptera	Ephemerellidae	Collector	4	6207	✔	572	1	74
Ephemeridae	Ephemeroptera	Ephemeridae	Collector	4	197	✔	46	1	37
Ephydridae	Diptera	Ephydridae	Collector	7	1		1	1	1
Gammaridae	Amphipoda	Gammaridae	Collector	6	535	✔	95	1	30
Gelastocoridae	Hemiptera	Gelastocoridae	Predator	5	6	✔	2	2	4
Gerridae	Hemiptera	Gerridae	Predator	8	430	✔	120	1	14
Glossiphoniidae	Rhyncobdellida	Glossiphoniidae	Predator	8	7		1	7	7
Glossosomatidae	Trichoptera	Glossosomatidae	Scraper	0	378	✔	114	1	28
Gomphidae	Odonata-Anisoptera	Gomphidae	Predator	1	430	✔	210	1	11
Gyrinidae	Coleoptera	Gyrinidae	Predator	5	345	✔	70	1	16
Haliplidae	Coleoptera	Haliplidae	Shredder	7	86	✔	28	1	8
Haplotaxidae	Haplotaxida	Haplotaxidae	Collector	8	1		1	1	1
Hebridae	Hemiptera	Hebridae	Predator	5	1		1	1	1
Helicopsychidae	Trichoptera	Helicopsychidae	Shredder	3	416	✔	104	1	35
Heptageniidae	Ephemeroptera	Heptageniidae	Scraper	4	11080	✔	847	1	77
Hirudinidae	Arhyncobdellida	Hirudinidae	Predator	7	14	✔	11	1	2
Hydrachnidae	Hydracarina	Hydrachnidae	Predator	5	295	✔	130	1	10
Hydrobiidae	Neotaenioglossa	Hydrobiidae	Scraper	3	82	✔	17	1	12
Hydrometridae	Hemiptera	Hydrometridae	Predator	4	1		1	1	1
Hydrophilidae	Coleoptera	Hydrophilidae	Predator	5	38	✔	27	1	4
Hydropsychidae	Trichoptera	Hydropsychidae	Filterer	6	22102	✔	956	1	105
Hydroptilidae	Trichoptera	Hydroptilidae	Scraper	6	95	✔	42	1	6
Lebertiidae	Hydracarina	Lebertiidae	Predator	5	4		3	1	2
Lepidostomatidae	Trichoptera	Lepidostomatidae	Shredder	1	5	✔	3	1	3
Leptoceridae	Trichoptera	Leptoceridae	Collector	4	139	✔	56	1	20
Leptophlebiidae	Ephemeroptera	Leptophlebiidae	Collector	2	620	✔	102	1	32
Leuctridae	Plecoptera	Leuctridae	Shredder	0	205	✔	50	1	30
Libellulidae	Odonata-Anisoptera	Libellulidae	Predator	9	48		10	1	20
Limnephilidae	Trichoptera	Limnephilidae	Shredder	4	177	✔	76	1	25
Lumbriculidae	Lumbriculida	Lumbriculidae	Collector	8	1431	✔	414	1	55
Lymnaeidae	Basommatophora	Lymnaeidae	Scraper	7	28	✔	13	1	6
Macromiidae	Odonata-Anisoptera	Macromiidae	Predator	3	236	✔	103	1	25
Mesoveliidae	Hemiptera	Mesoveliidae	Predator	6	12	✔	5	1	6
Molannidae	Trichoptera	Molannidae	Scraper	6	1	✔	1	1	1
Naididae	Tubificida	Naididae	Collector	8	133	✔	26	1	23
Nemouridae	Plecoptera	Nemouridae	Shredder	2	385	✔	81	1	47
Neoephemeridae	Ephemeroptera	Neoephemeridae	Collector	3	19		2	5	14
Nepidae	Hemiptera	Nepidae	Predator	6	15	✔	8	1	5
Odontoceridae	Trichoptera	Odontoceridae	Scraper	0	98	✔	29	1	20
Oligoneuriidae	Ephemeroptera	Oligoneuriidae	Filterer	2	8520	✔	689	1	96
Palaemonidae	Decapoda	Palaemonidae		5	1		1	1	1
Peltoperlidae	Plecoptera	Peltoperlidae	Shredder	2	237	✔	59	1	17

Table C-1 (continued).

FinalID	Order	Family	FFG	Tol Val	Total count (all samples)	Found in Ref sites?	No. Benthic samples where found	Individuals per sample	
								Min	Max
Perlidae	Plecoptera	Perlidae	Predator	1	3623	✔	547	1	350
Perlodidae	Plecoptera	Perlodidae	Predator	2	670	✔	156	1	21
Petaluridae	Odonata-Anisoptera	Petaluridae	Predator	4	1		1	1	1
Philopotamidae	Trichoptera	Philopotamidae	Collector	3	3678	✔	494	1	61
Phryganeidae	Trichoptera	Phryganeidae	Shredder	4	4		1	4	4
Physidae	Basommatophora	Physidae	Scraper	8	426	✔	117	1	22
Planariidae	Tricladida	Planariidae	Omnivore	8	2136	✔	202	1	99
Planorbidae	Basommatophora	Planorbidae	Scraper	7	137	✔	55	1	17
Pleuroceridae	Neotaenioglossa	Pleuroceridae	Scraper	4	4563	✔	404	1	82
Polycentropodidae	Trichoptera	Polycentropodidae	Filterer	6	57	✔	32	1	6
Polymitarcyidae	Ephemeroptera	Polymitarcyidae	Collector	2	13	✔	8	1	4
Potamanthidae	Ephemeroptera	Potamanthidae	Collector	4	8	✔	6	1	3
Psephenidae	Coleoptera	Psephenidae	Scraper	4	1812	✔	504	1	30
Psychomyiidae	Trichoptera	Psychomyiidae	Collector	2	13	✔	7	1	6
Pteronarcyidae	Plecoptera	Pteronarcyidae	Shredder	0	914	✔	170	1	64
Ptilodactylidae	Coleoptera	Ptilodactylidae	Shredder	5	4	✔	3	1	2
Pyralidae	Lepidoptera	Pyralidae	Shredder	5	40	✔	22	1	4
Rhyacophilidae	Trichoptera	Rhyacophilidae	Predator	0	301	✔	120	1	14
Sialidae	Megaloptera	Sialidae	Predator	4	58	✔	35	1	9
Simuliidae	Diptera	Simuliidae	Filterer	6	4949	✔	559	1	109
Siphlonuridae	Ephemeroptera	Siphlonuridae	Collector	7	99	✔	33	1	12
Sphaeriidae	Unionida	Sphaeriidae	Filterer	8	213	✔	46	1	85
Spongillidae	Haplosclerida	Spongillidae	Filterer	2	226	✔	25	1	100
Stratiomyidae	Diptera	Stratiomyidae	Collector	10	5		3	1	3
Syrphidae	Diptera	Syrphidae	Collector	10	10		1	10	10
Tabanidae	Diptera	Tabanidae	Predator	6	18	✔	14	1	2
Taeniopterygidae	Plecoptera	Taeniopterygidae	Shredder	2	579	✔	74	1	63
Tanyderidae	Diptera	Tanyderidae	Collector	7	3		2	1	2
Tipulidae	Diptera	Tipulidae	Shredder	3	1651	✔	540	1	21
Tricorythidae	Ephemeroptera	Tricorythidae	Collector	4	153	✔	71	1	17
Tubificidae	Tubificida	Tubificidae	Collector	10	935	✔	55	1	100
Unionidae	Unionida	Unionidae	Filterer	4	52	✔	23	1	6
Veliidae	Hemiptera	Veliidae	Predator	6	333	✔	89	1	12
Viviparidae	Architaenoglossa	Viviparidae	Scraper	3	4	✔	1	4	4

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APPENDIX D

METRIC AND INDEX VALUES OF VIRGINIA STREAM SAMPLES

Table D-1. Site and sample metric and index values, Virginia DEQ 1994-2002 reference site data, non-coastal streams, stream orders 1-4. Index (SCI) was developed with 1994-1998 data and tested with 1999-2000 data indicated in Data Set column by "d" and "t", respectively. Numbers of individual organisms in each sample are indicated by "N Ind." Metric acronyms are defined in Table 3-3. Samples are sorted by ascending Station ID and Sample Date. Some names are common to multiple streams.

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Adair Run	ADR00013	ADR1606	v	ref	WCentral	69	3	5/8/01	131	15	68.2	10	90.9	23.7	38.6	48.1	100.0	22.1	42.9	9.2	90.8	51.1	70.6	3.3	98.5	75.1
Beaverdam Cr	BDA01179	BDA1616	v	ref	WCentral	66	2	4/6/01	117	12	54.5	7	63.6	18.8	30.7	6.8	19.2	13.7	26.5	23.9	76.1	58.1	60.5	5.2	70.3	50.2
Beaverdam Cr	BDA01179	BDA1642	v	ref	WCentral	66	2	10/23/01	109	17	77.3	7	63.6	15.6	25.5	20.2	56.7	25.7	49.8	22.9	77.1	41.3	84.8	4.7	78.3	64.1
Buffalo Cr	BLD00022	BLD55	d	ref	Valley	67	3	10/4/94	154	19	86.4	7	63.6	24.7	40.3	15.6	43.7	35.7	69.2	8.4	91.6	27.9	100.0	4.2	85.2	72.5
Buffalo Cr	BLD00022	BLD228	d	ref	Valley	67	3	5/25/95	129	18	81.8	8	72.7	27.9	45.6	14.0	39.2	39.5	76.6	15.5	84.5	34.9	94.1	4.2	85.3	72.5
Buffalo Cr	BLD00022	BLD959	d	ref	Valley	67	3	10/2/97	143	17	77.3	7	63.6	39.2	63.9	9.1	25.5	21.7	42.0	3.5	96.5	52.4	68.7	3.8	90.6	66.0
Buffalo Cr	BLD00022	BLD1302	d	ref	Valley	67	3	10/15/98	115	11	50.0	5	45.5	47.8	78.1	21.7	61.0	27.0	52.2	2.6	97.4	47.0	76.6	3.7	92.5	69.2
Buffalo Cr	BLD00022	BLD2829	v	ref	Valley	67	3	10/30/00	142	13	59.1	5	45.5	16.9	27.6	4.9	13.8	73.9	100.0	1.4	98.6	57.0	62.0	4.3	83.7	61.3
Bullpasture R	BLP00079	BLP56	d	ref	Valley	67	3	10/11/94	189	22	100.0	10	90.9	55.0	89.8	10.6	29.7	34.4	66.7	2.6	97.4	50.3	71.8	3.3	98.4	80.6
Bullpasture R	BLP00079	BLP406	d	ref	Valley	67	3	10/26/95	162	20	90.9	10	90.9	48.8	79.6	19.8	55.4	35.8	69.4	1.2	98.8	45.1	79.4	3.1	100.0	83.0
Bullpasture R	BLP00079	BLP548	d	ref	Valley	67	3	5/20/96	119	21	95.5	13	100.0	49.6	80.9	24.4	68.4	29.4	57.0	7.6	92.4	33.6	95.9	3.2	99.4	86.2
Bullpasture R	BLP00079	BLP790	d	ref	Valley	67	3	5/28/97	152	25	100.0	14	100.0	25.7	41.9	30.3	84.9	17.8	34.4	9.2	90.8	23.7	100.0	3.7	92.0	80.5
Bullpasture R	BLP00079	BLP1005	d	ref	Valley	67	3	9/30/97	148	22	100.0	10	90.9	50.7	82.7	12.2	34.1	28.4	55.0	2.0	98.0	42.6	83.0	3.5	95.7	79.9
Bullpasture R	BLP00079	BLP1300	d	ref	Valley	67	3	10/7/98	100	15	68.2	9	81.8	52.0	84.9	4.0	11.2	62.0	100.0	3.0	97.0	58.0	60.7	4.3	84.5	73.5
Bullpasture R	BLP00079	BLP1408	v	ref	Valley	67	3	5/13/99	99	18	81.8	10	90.9	38.4	62.7	20.2	56.7	24.2	47.0	30.3	69.7	50.5	71.5	4.3	83.1	70.4
Bullpasture R	BLP00079	BLP2769	v	ref	Valley	67	3	5/3/00	103	15	68.2	6	54.5	37.9	61.8	1.9	5.5	47.6	92.2	13.6	86.4	35.9	92.6	4.4	82.2	67.9
Bullpasture R	BLP00079	BLP2831	v	ref	Valley	67	3	10/12/00	117	17	77.3	9	81.8	51.3	83.7	7.7	21.6	53.0	100.0	3.4	96.6	52.1	69.1	4.1	86.7	77.1
Bullpasture R	BLP00079	BLP2915	v	ref	Valley	67	3	10/31/01	120	12	54.5	9	81.8	71.7	100.0	5.0	14.0	56.7	100.0	0.8	99.2	63.3	53.0	3.8	91.5	74.3
NF Buffalo R	BNF00352	BNF1598	v	ref	WCentral	66	2	4/3/01	95	18	81.8	12	100.0	69.5	100.0	16.8	47.3	44.2	85.7	4.2	95.8	66.3	48.7	3.7	92.8	81.5
NF Buffalo R	BNF00352	BNF1645	v	ref	WCentral	66	2	10/22/01	119	21	95.5	14	100.0	22.7	37.0	52.9	100.0	24.4	47.2	2.5	97.5	40.3	86.2	3.2	100.0	82.9
Beaver Cr	BRC00270	BRC2989	v	ref	Northern	64	1	4/25/01	134	18	81.8	9	81.8	47.8	78.0	29.1	81.7	24.6	47.7	0.7	99.3	44.0	80.8	3.8	91.7	80.4
Beaver Cr	BRC00270	BRC3002	v	ref	Northern	64	1	10/2/01	102	10	45.5	5	45.5	43.1	70.4	38.2	100.0	14.7	28.5	1.0	99.0	63.7	52.4	3.2	100.0	67.7
Burks Fork	BRF01996	BRF1640	v	ref	WCentral	66	2	11/1/01	126	20	90.9	9	81.8	16.7	27.2	13.5	37.9	49.2	95.4	11.9	88.1	40.5	86.0	4.4	82.6	73.7
Brumley Cr	BRU00673	BRU2884	v	ref	SWest	67	4	6/6/01	91	12	54.5	9	81.8	58.2	95.1	16.5	46.3	2.2	4.3	18.7	81.3	74.7	36.5	4.0	87.5	60.9
Bottom Cr	BTM00004	BTM1578	v	ref	WCentral	66	3	10/12/00	204	20	90.9	9	81.8	16.7	27.2	27.5	77.1	8.3	16.1	1.0	99.0	42.6	82.8	4.3	84.1	69.9
Catharpin Cr	CAA00803	CAA3026	v	ref	Northern	64	2	6/6/02	124	18	81.8	11	100.0	18.5	30.3	52.4	100.0	11.3	21.9	0.8	99.2	36.3	92.0	3.0	100.0	78.1
Callahan Cr	CAL00003	CAL295	d	ref	SWest	69	4	7/5/95	138	8	36.4	4	36.4	55.1	89.9	1.4	4.1	0.0	0.0	4.3	95.7	76.8	33.5	4.5	80.3	47.0
Callahan Cr	CAL00003	CAL358	d	ref	SWest	69	4	12/13/95	97	10	45.5	6	54.5	37.1	60.6	3.1	8.7	20.6	40.0	23.7	76.3	42.3	83.4	5.1	72.4	55.2
Catoctin Cr	CAX00457	CAX177	d	ref	Northern	64	3	9/20/94	115	20	90.9	7	63.6	15.7	25.5	20.9	58.6	21.7	42.1	0.9	99.1	26.1	100.0	4.3	83.8	70.5
Catoctin Cr	CAX00457	CAX340	d	ref	Northern	64	3	4/25/95	129	19	86.4	6	54.5	35.7	58.2	25.6	71.8	17.8	34.6	4.7	95.3	40.3	86.2	3.3	97.7	73.1
Catoctin Cr	CAX00457	CAX467	d	ref	Northern	64	3	10/11/95	102	19	86.4	4	36.4	40.2	65.6	5.9	16.5	26.5	51.3	2.9	97.1	40.2	86.4	3.9	89.8	66.2
Catoctin Cr	CAX00457	CAX590	d	ref	Northern	64	3	5/21/96	164	22	100.0	6	54.5	47.6	77.6	5.5	15.4	15.9	30.7	8.5	91.5	48.8	74.0	3.7	92.3	67.0
Catoctin Cr	CAX00457	CAX657	d	ref	Northern	64	3	10/24/96	126	15	68.2	6	54.5	50.0	81.6	5.6	15.6	15.9	30.8	0.8	99.2	56.3	63.1	3.8	91.8	63.1
Catoctin Cr	CAX00457	CAX909	d	ref	Northern	64	3	4/4/97	124	18	81.8	6	54.5	41.9	68.5	13.7	38.5	20.2	39.1	0.8	99.2	37.1	90.9	3.8	91.7	70.5
Catoctin Cr	CAX00457	CAX946	d	ref	Northern	64	3	10/1/97	166	22	100.0	7	63.6	21.7	35.4	29.5	82.9	16.9	32.7	4.2	95.8	27.7	100.0	3.6	93.4	75.5
Catoctin Cr	CAX00457	CAX1214	d	ref	Northern	64	3	5/26/98	100	17	77.3	7	63.6	30.0	49.0	23.0	64.6	27.0	52.3	2.0	98.0	32.0	98.2	3.6	94.8	74.7
Catoctin Cr	CAX00457	CAX1280	d	ref	Northern	64	3	11/2/98	137	17	77.3	7	63.6	40.9	66.7	13.1	36.9	23.4	45.3	2.2	97.8	43.1	82.2	4.1	87.3	69.7
Catoctin Cr	CAX00457	CAX1396	v	ref	Northern	64	3	4/14/99	146	22	100.0	6	54.5	33.6	54.8	8.9	25.0	37.0	71.7	1.4	98.6	28.8	100.0	4.0	87.7	74.0
Catoctin Cr	CAX00457	CAX1424	v	ref	Northern	64	3	12/9/99	140	19	86.4	7	63.6	17.1	28.0	46.4	100.0	13.6	26.3	1.4	98.6	51.4	70.2	3.5	95.7	71.1
Catoctin Cr	CAX00457	CAX2765	v	ref	Northern	64	3	4/11/00	143	21	95.5	6	54.5	51.0	83.3	0.0	0.0	28.0	54.2	2.8	97.2	44.1	80.8	3.6	94.1	70.0
Catoctin Cr	CAX00457	CAX2792	v	ref	Northern	64	3	11/27/00	224	19	86.4	8	72.7	64.7	100.0	4.5	12.5	11.2	21.6	0.0	100.0	61.6	55.5	3.3	98.8	68.4
Catoctin Cr	CAX00457	CAX2973	v	ref	Northern	64	3	4/9/01	126	17	77.3	5	45.5	42.1	68.7	0.0	0.0	27.8	53.8	0.0	100.0	39.7	87.1	3.7	93.2	65.7
Catoctin Cr	CAX00457	CAX3035	v	ref	Northern	64	3	5/15/02	108	14	63.6	8	72.7	49.1	80.1	18.5	52.0	29.6	57.4	0.9	99.1	45.4	78.9	3.2	99.9	75.5
Cedar Cr	CDR04301	CDR549	d	ref	Valley	67	2	5/1/96	145	22	100.0	14	100.0	20.0	32.6	43.4	100.0	8.3	16.0	13.1	86.9	26.9	100.0	3.6	93.6	78.7
Calfpasture R	CFP00002	CFP1412	v	ref	Valley	67	4	5/6/99	115	18	81.8	6	54.5	2.6	4.3	7.0	19.5	72.2	100.0	7.8	92.2	61.7	55.3	4.3	84.1	61.5
Calfpasture R	CFP00002	CFP2718	v	ref	Valley	67	4	10/27/99	99	17	77.3	7	63.6	13.1	21.4	11.1	31.2	64.6	100.0	5.1	94.9	55.6	64.2	4.0	87.7	67.6
Calfpasture R	CFP00002	CFP2772	v	ref	Valley	67	4	5/9/00	102	15	68.2	7	63.6	18.6	30.4	14.7	41.3	52.9	100.0	2.9	97.1	49.0	73.6	4.2	85.1	69.9
Calfpasture R	CFP00002	CFP2833	v	ref	Valley	67	4	10/31/00	132	21	95.5	10	90.9	12.9	21.0	17.4	48.9	43.2	83.7	1.5	98.5	50.8	71.1	4.0	88.5	74.8
Calfpasture R	CFP00002	CFP2919	v	ref	Valley	67	4	10/29/01	130	13	59.1	7	63.6	17.7	28.9	18.5	51.8	48.5	93.9	0.8	99.2	43.8	81.1	3.9	90.3	71.0

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Calfpasture R	CFP00394	CFP88	d	ref	Valley	67	4	10/12/94	137	22	100.0	9	81.8	29.9	48.9	21.9	61.5	35.8	69.3	0.0	100.0	38.7	88.6	3.8	91.8	80.2
Calfpasture R	CFP00394	CFP229	d	ref	Valley	67	4	5/10/95	105	20	90.9	10	90.9	41.0	66.8	16.2	45.4	41.0	79.4	10.5	89.5	35.2	93.5	3.8	91.5	81.0
Calfpasture R	CFP00394	CFP407	d	ref	Valley	67	4	10/17/95	109	17	77.3	8	72.7	41.3	67.4	17.4	48.9	25.7	49.8	0.0	100.0	39.4	87.5	3.9	90.2	74.2
Big Chestnut Cr	CNT00132	CNT1541	v	ref	WCentral	45	4	9/28/00	169	26	100.0	11	100.0	45.0	73.4	8.3	23.3	33.7	65.4	1.2	98.8	42.6	82.9	3.8	91.1	79.4
Big Chestnut Cr	CNT00132	CNT1664	v	ref	WCentral	45	4	11/7/01	108	17	77.3	11	100.0	58.3	95.2	7.4	20.8	39.8	77.2	0.9	99.1	56.5	62.9	3.7	92.7	78.1
Cooper Cr	COO00235	COO6364	v	ref	SCRO	45	1	4/11/01	106	17	77.3	10	90.9	19.8	32.3	22.6	63.6	32.1	62.2	9.4	90.6	27.4	100.0	3.8	91.8	76.1
Cooper Cr	COO00235	COO6365	v	ref	SCRO	45	1	11/1/01	121	14	63.6	6	54.5	26.4	43.2	10.7	30.2	38.0	73.7	12.4	87.6	30.6	100.0	3.9	89.9	67.8
Cripple Cr	CPL01837	CRI120	d	ref	SWest	67	4	10/24/94	157	14	63.6	8	72.7	40.1	65.5	2.5	7.2	40.1	77.8	13.4	86.6	35.7	92.9	4.3	83.5	68.7
Cripple Cr	CPL01837	CPL515	d	ref	SWest	67	4	4/25/96	92	12	54.5	7	63.6	35.9	58.6	4.3	12.2	23.9	46.3	18.5	81.5	40.2	86.4	4.6	79.2	60.3
Cripple Cr	CPL01837	CPL1110	d	ref	SWest	67	4	12/16/97	118	19	86.4	13	100.0	48.3	78.9	16.9	47.6	44.9	87.0	5.9	94.1	43.2	82.0	3.9	90.2	83.3
Craig Cr	CRG07447	CRG1580	v	ref	WCentral	67	1	9/12/00	212	18	81.8	8	72.7	13.2	21.6	32.1	90.0	10.8	21.0	4.2	95.8	53.3	67.5	4.0	88.2	67.3
Craig Cr	CRG07447	CRG1581	v	ref	WCentral	67	1	9/12/00	83	16	72.7	8	72.7	33.7	55.1	10.8	30.4	39.8	77.1	20.5	79.5	42.2	83.5	4.3	83.2	69.3
Craig Cr	CRG07447	CRG1594	v	ref	WCentral	67	1	3/13/01	100	14	63.6	7	63.6	17.0	27.8	12.0	33.7	8.0	15.5	25.0	75.0	45.0	79.4	4.8	76.0	54.3
Cowpasture R	CWP04206	COW86	d	ref	Valley	67	3	10/24/94	116	21	95.5	11	100.0	32.8	53.5	23.3	65.3	41.4	80.2	3.4	96.6	31.9	98.4	3.4	97.7	85.9
Cowpasture R	CWP05066	CWP233	d	ref	Valley	67	4	5/24/95	137	25	100.0	12	100.0	32.1	52.4	17.5	49.2	27.0	52.3	0.0	100.0	24.8	100.0	4.2	84.6	79.8
Cowpasture R	CWP05066	CWP412	d	ref	Valley	67	4	10/26/95	140	22	100.0	11	100.0	37.9	61.8	14.3	40.1	37.9	73.4	5.0	95.0	35.0	93.9	3.7	92.4	82.1
Cowpasture R	CWP05066	CWP1315	d	ref	Valley	67	4	10/7/98	138	18	81.8	11	100.0	31.2	50.9	11.6	32.5	37.7	73.0	15.2	84.8	34.1	95.2	4.2	85.3	75.5
Cowpasture R	CWP05066	CWP2903	v	ref	Valley	67	4	5/13/99	142	14	63.6	8	72.7	17.6	28.7	3.5	9.9	69.0	100.0	11.3	88.7	56.3	63.1	4.2	85.3	64.0
Cowpasture R	CWP05066	CWP050.66	v	ref	Valley	67	4	10/15/99	149	16	72.7	9	81.8	36.9	60.3	8.1	22.6	55.7	100.0	1.3	98.7	51.0	70.8	4.0	88.9	74.5
Cowpasture R	CWP05066	CWP2904	v	ref	Valley	67	4	10/15/99	134	10	45.5	5	45.5	35.1	57.3	6.0	16.8	61.2	100.0	1.5	98.5	56.7	62.5	4.0	88.2	64.3
Cowpasture R	CWP05066	CWP2776	v	ref	Valley	67	4	5/3/00	143	18	81.8	8	72.7	23.8	38.8	5.6	15.7	63.6	100.0	4.9	95.1	49.7	72.7	4.1	87.3	70.5
Cowpasture R	CWP05066	CWP2835	v	ref	Valley	67	4	10/12/00	112	14	63.6	9	81.8	57.1	93.3	8.9	25.1	51.8	100.0	0.0	100.0	53.6	67.1	3.7	93.3	78.0
Cowpasture R	CWP05066	CWP2901	v	ref	Valley	67	4	10/31/01	102	14	63.6	8	72.7	45.1	73.6	15.7	44.0	48.0	93.1	5.9	94.1	40.2	86.4	3.8	90.5	77.3
Cowpasture R	CWP05066	CWP2969	v	ref	Valley	67	4	5/6/02	132	17	77.3	9	81.8	23.5	38.3	10.6	29.8	69.7	100.0	5.3	94.7	54.5	65.7	3.9	89.1	72.1
Cowpasture R	CWP05066	CWP2970	v	ref	Valley	67	4	5/6/02	122	20	90.9	11	100.0	42.6	69.6	9.0	25.3	45.1	87.4	7.4	92.6	31.1	99.5	4.1	86.8	81.5
Cowpasture R	CWP05378	CWP2880	v	ref	Valley	67		5/30/01	115	15	68.2	6	54.5	48.7	79.5	0.0	0.0	14.8	28.6	20.9	79.1	41.7	84.2	4.9	75.5	58.7
Cowpasture R	CWP05378	CWP2896	v	ref	Valley	67		10/11/01	153	16	72.7	11	100.0	52.3	85.4	24.2	67.9	32.0	62.1	3.9	96.1	48.4	74.6	3.5	94.9	81.7
Dismal Cr	DIS01794	DIS129	d	ref	SWest	69	3	12/8/94	106	13	59.1	7	63.6	19.8	32.3	9.4	26.5	32.1	62.2	8.5	91.5	56.6	62.7	4.6	79.9	59.7
Dismal Cr	DIS01794	DIS501	d	ref	SWest	69	3	4/4/96	112	14	63.6	7	63.6	38.4	62.7	8.0	22.6	34.8	67.5	14.3	85.7	35.7	92.9	4.5	81.1	67.5
Dismal Cr	DIS01794	DIS1099	d	ref	SWest	69	3	11/12/97	125	14	63.6	9	81.8	38.4	62.7	11.2	31.4	31.2	60.5	5.6	94.4	48.8	74.0	3.8	90.8	69.9
Dry Fork	DRK03638	DRY126	d	ref	SWest	69	2	11/14/94	93	12	54.5	6	54.5	38.7	63.2	21.5	60.4	43.0	83.4	6.5	93.5	48.4	74.6	3.8	90.4	71.8
Dry Fork	DRK03638	DRK499	d	ref	SWest	69	2	4/24/96	97	12	54.5	8	72.7	39.2	63.9	16.5	46.3	20.6	40.0	22.7	77.3	38.1	89.3	4.0	88.6	66.6
Fiery Run	FIR00239	FIR2994	v	ref	Northern	64	2	7/3/01	100	8	36.4	6	54.5	46.0	75.1	0.0	0.0	24.0	46.5	0.0	100.0	55.0	65.0	4.0	88.0	58.2
Fiery Run	FIR00500	FIR2995	v	ref	Northern	64	2	7/19/01	96	12	54.5	8	72.7	15.6	25.5	19.8	55.6	8.3	16.1	0.0	100.0	61.5	55.7	4.5	81.1	57.7
Fiery Run	FIR00500	FIR3010	v	ref	Northern	64	2	11/1/01	97	10	45.5	6	54.5	50.5	82.5	11.3	31.8	48.5	93.9	0.0	100.0	80.4	28.3	4.5	81.2	64.7
Green Cr	GCR00001	GCR22	d	ref	WCentral	66	1	10/25/94	104	11	50.0	7	63.6	29.8	48.7	20.2	56.7	10.6	20.5	1.0	99.0	54.8	65.3	4.5	80.5	60.5
Green Cr	GCR00001	GCR202	d	ref	WCentral	66	1	5/18/95	125	12	54.5	7	63.6	56.8	92.7	8.0	22.5	12.8	24.8	1.6	98.4	53.6	67.0	4.1	87.3	63.9
Green Cr	GCR00001	GCR398	d	ref	WCentral	66	1	11/16/95	95	11	50.0	8	72.7	36.8	60.1	15.8	44.3	24.2	46.9	1.1	98.9	63.2	53.2	4.3	83.2	63.7
Green Cr	GCR00001	GCR530	d	ref	WCentral	66	1	5/21/96	55	14	63.6	8	72.7	27.3	44.5	10.9	30.6	49.1	95.1	0.0	100.0	43.6	81.4	3.2	99.4	73.4
Green Cr	GCR00001	GCR758	d	ref	WCentral	66	1	1/21/97	125	18	81.8	13	100.0	55.2	90.1	27.2	76.4	32.8	63.6	1.6	98.4	44.8	79.7	3.5	96.2	85.8
Green Cr	GCR00001	GCR879	d	ref	WCentral	66	1	5/23/97	120	14	63.6	10	90.9	70.0	100.0	5.8	16.4	26.7	51.7	0.0	100.0	55.8	63.8	3.5	96.1	72.8
Green Cr	GCR00001	GCR1044	d	ref	WCentral	66	1	10/20/97	130	11	50.0	7	63.6	26.2	42.7	18.5	51.8	17.7	34.3	2.3	97.7	58.5	60.0	4.6	79.9	60.0
Green Cr	GCR00001	GCR1157	d	ref	WCentral	66	1	5/6/98	109	12	54.5	6	54.5	63.3	100.0	12.8	36.1	10.1	19.6	3.7	96.3	67.9	46.4	4.0	87.9	61.9
Green Cr	GCR00001	GCR1359	d	ref	WCentral	66	1	10/26/98	118	10	45.5	7	63.6	21.2	34.6	11.0	30.9	16.9	32.8	2.5	97.5	78.8	30.6	5.1	71.6	50.9
Green Cr	GCR00001	GCR1418	v	ref	WCentral	66	1	4/14/99	120	14	63.6	8	72.7	68.3	100.0	14.2	39.8	31.7	61.4	0.0	100.0	68.3	45.7	3.8	91.8	71.9
Green Cr	GCR00001	GCR1467	v	ref	WCentral	66	1	10/25/99	111	15	68.2	10	90.9	37.8	61.8	25.2	70.8	26.1	50.6	1.8	98.2	45.0	79.4	4.0	87.6	75.9
Green Cr	GCR00001	GCR1494	v	ref	WCentral	66	1	4/5/00	101	12	54.5	8	72.7	40.6	66.3	27.7	77.8	32.7	63.3	0.0	100.0	52.5	68.6	2.5	100.0	75.4
Green Cr	GCR00001	GCR1571	v	ref	WCentral	66	1	10/2/00	198	16	72.7	9	81.8	33.8	55.2	11.6	32.6	28.8	55.8	3.0	97.0	51.5	70.0	4.5	80.5	68.2
Goose Cr	GOO02244	GOO2992	v	ref	Northern	64		6/13/01	101	11	50.0	6	54.5	55.4	90.5	0.0	0.0	6.9	13.4	0.0	100.0	63.4	52.9	3.1	100.0	57.7

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Goose Cr	GOO02244	GOO3015	v	ref	Northern	64		10/9/01	109	14	63.6	7	63.6	40.4	65.9	22.0	61.8	15.6	30.2	0.0	100.0	48.6	74.2	3.3	97.7	69.7
Goose Cr	GOO02244	GOO3041	v	ref	Northern	64		6/11/02	110	17	77.3	8	72.7	70.0	100.0	8.2	23.0	16.4	31.7	0.0	100.0	52.7	68.3	3.5	95.0	71.0
Goose Cr	GOO04436	GOO178	d	ref	Northern	64	2	10/3/94	127	23	100.0	7	63.6	33.9	55.3	5.5	15.5	27.6	53.4	0.8	99.2	24.4	100.0	4.5	80.5	70.9
Goose Cr	GOO04436	GOO352	d	ref	Northern	64	2	5/18/95	105	19	86.4	6	54.5	39.0	63.7	10.5	29.4	28.6	55.4	3.8	96.2	32.4	97.7	4.1	87.1	71.3
Goose Cr	GOO04436	GOO463	d	ref	Northern	64	2	9/28/95	115	21	95.5	7	63.6	32.2	52.5	12.2	34.2	18.3	35.4	1.7	98.3	28.7	100.0	4.4	82.8	70.3
Goose Cr	GOO04436	GOO589	d	ref	Northern	64	2	5/20/96	134	17	77.3	9	81.8	66.4	100.0	11.2	31.4	19.4	37.6	0.7	99.3	50.7	71.1	3.7	91.9	73.8
Goose Cr	GOO04436	GOO663	d	ref	Northern	64	2	11/18/96	125	13	59.1	7	63.6	28.0	45.7	20.8	58.4	8.0	15.5	1.6	98.4	50.4	71.6	3.9	89.3	62.7
Greendale Cr	GRN00006	GRN490	d	ref	SWest	69	3	5/20/96	104	14	63.6	10	90.9	30.8	50.2	16.3	45.9	21.2	41.0	28.8	71.2	54.8	65.3	4.2	84.8	64.1
Goose Cr	GSE00071	GSE1504	v	ref	WCentral	66		5/3/00	119	18	81.8	10	90.9	39.5	64.5	29.4	82.6	20.2	39.1	3.4	96.6	38.7	88.6	3.6	93.7	79.7
Goose Cr	GSE00071	GSE1565	v	ref	WCentral	66		10/12/00	256	23	100.0	12	100.0	24.2	39.5	11.7	32.9	14.5	28.0	2.3	97.7	50.4	71.7	4.7	77.7	68.4
Horsepen Cr	HAP00063	HAP504	d	ref	SWest	69	3	5/23/96	98	11	50.0	8	72.7	34.7	56.6	14.3	40.1	6.1	11.9	45.9	54.1	62.2	54.5	4.3	84.3	53.0
Harris Cr	HAZ00634	HAZ1648	v	ref	WCentral	45	3	5/10/01	102	13	59.1	9	81.8	72.5	100.0	4.9	13.8	8.8	17.1	9.8	90.2	54.9	65.1	4.1	87.3	64.3
Harris Cr	HAZ00634	HAZ1650	v	ref	WCentral	45	3	10/22/01	107	24	100.0	8	72.7	21.5	35.1	12.1	34.1	53.3	100.0	6.5	93.5	44.9	79.6	5.2	70.3	73.2
Hazel R	HAZ04243	HAZ174	d	ref	Northern	64	2	11/9/94	111	17	77.3	11	100.0	27.0	44.1	46.8	100.0	20.7	40.2	0.9	99.1	26.1	100.0	2.5	100.0	82.6
Hazel R	HAZ04243	HAZ344	d	ref	Northern	64	2	5/1/95	107	17	77.3	10	90.9	39.3	64.1	42.1	100.0	27.1	52.5	0.9	99.1	37.4	90.4	2.3	100.0	84.3
Hazel R	HAZ04243	HAZ458	d	ref	Northern	64	2	11/21/95	115	14	63.6	9	81.8	33.9	55.4	44.3	100.0	36.5	70.8	0.9	99.1	34.8	94.2	2.0	100.0	83.1
Hazel R	HAZ04243	HAZ592	d	ref	Northern	64	2	5/24/96	108	18	81.8	11	100.0	30.6	49.9	45.4	100.0	29.6	57.4	0.9	99.1	31.5	99.0	2.3	100.0	85.9
Hazel R	HAZ04243	HAZ655	d	ref	Northern	64	2	10/22/96	106	14	63.6	8	72.7	21.7	35.4	50.9	100.0	27.4	53.0	0.9	99.1	40.6	85.8	2.5	100.0	76.2
Hazel R	HAZ04243	HAZ903	d	ref	Northern	64	2	3/13/97	135	17	77.3	10	90.9	34.8	56.8	40.0	100.0	25.9	50.2	3.0	97.0	34.8	94.2	2.7	100.0	83.3
Hazel R	HAZ04243	HAZ940	d	ref	Northern	64	2	10/19/97	126	16	72.7	11	100.0	29.4	47.9	49.2	100.0	16.7	32.3	0.8	99.2	33.3	96.3	2.5	100.0	81.1
Hazel R	HAZ04243	HAZ1227	d	ref	Northern	64	2	4/2/98	130	17	77.3	12	100.0	37.7	61.5	40.0	100.0	40.0	77.5	0.8	99.2	33.8	95.6	2.5	100.0	88.9
Hazel R	HAZ04243	HAZ1275	d	ref	Northern	64	2	11/17/98	119	17	77.3	11	100.0	26.1	42.5	59.7	100.0	18.5	35.8	0.8	99.2	35.3	93.5	2.2	100.0	81.0
Hazel R	HAZ04243	HAZ1415	v	ref	Northern	64	2	4/19/99	179	17	77.3	10	90.9	53.6	87.5	26.8	75.3	38.5	74.7	1.1	98.9	46.4	77.5	2.8	100.0	85.3
Hazel R	HAZ04243	HAZ1433	v	ref	Northern	64	2	11/18/99	119	13	59.1	10	90.9	22.7	37.0	60.5	100.0	21.0	40.7	0.8	99.2	39.5	87.4	1.6	100.0	76.8
Hazel R	HAZ04243	HAZ2781	v	ref	Northern	64	2	4/12/00	124	13	59.1	9	81.8	45.2	73.7	39.5	100.0	27.4	53.1	0.0	100.0	32.3	97.8	2.1	100.0	83.2
Hazel R	HAZ04243	HAZ2981	v	ref	Northern	64	2	5/10/01	112	12	54.5	10	90.9	51.8	84.5	41.1	100.0	9.8	19.0	0.0	100.0	55.4	64.5	2.6	100.0	76.7
Hazel R	HAZ04243	HAZ3009	v	ref	Northern	64	2	10/25/01	108	15	68.2	11	100.0	32.4	52.9	44.4	100.0	19.4	37.7	0.0	100.0	33.3	96.3	2.8	100.0	81.9
Hazel R	HAZ04243	HAZ3042	v	ref	Northern	64	2	5/1/02	119	16	72.7	12	100.0	27.7	45.3	61.3	100.0	13.4	26.1	0.0	100.0	32.8	97.1	2.5	100.0	80.1
Helton Cr	HTN00920	HEL137	d	ref	SWest	66	3	11/29/94	94	11	50.0	6	54.5	44.7	72.9	21.3	59.7	28.7	55.7	16.0	84.0	44.7	79.9	3.6	93.5	68.8
Helton Cr	HTN00920	HTN1108	d	ref	SWest	66	3	12/11/97	104	11	50.0	7	63.6	34.6	56.5	33.7	94.5	22.1	42.9	19.2	80.8	38.5	88.9	3.3	98.9	72.0
Helton Cr	HTN00920	HTN1208	d	ref	SWest	66	3	6/2/98	95	15	68.2	8	72.7	62.1	100.0	11.6	32.5	37.9	73.4	9.5	90.5	56.8	62.3	3.8	91.6	73.9
Indian Cr	IDI00367	IDI1079	d	ref	SWest	67	3	10/30/97	105	18	81.8	10	90.9	27.6	45.1	19.0	53.5	43.8	84.9	11.4	88.6	34.3	94.9	3.9	90.3	78.8
Indian Cr	IDI00367	IDI1189	d	ref	SWest	67	3	6/22/98	97	12	54.5	6	54.5	22.7	37.0	8.2	23.2	16.5	32.0	18.6	81.4	42.3	83.4	4.7	77.6	55.5
Indian Cr	IND01025	IND298	d	ref	SWest	67	4	4/19/95	98	18	81.8	8	72.7	45.9	75.0	3.1	8.6	35.7	69.2	13.3	86.7	31.6	98.8	4.2	85.6	72.3
Indian Cr	IND01025	IND360	d	ref	SWest	67	4	10/17/95	145	12	54.5	6	54.5	75.9	100.0	4.8	13.6	46.9	90.9	0.7	99.3	73.8	37.9	3.3	98.5	68.7
Indian Cr	IND01025	IND771	d	ref	SWest	67	4	4/15/97	115	15	68.2	5	45.5	22.6	36.9	3.5	9.8	31.3	60.7	10.4	89.6	33.0	96.7	5.0	72.8	60.0
Indian Cr	IND01025	IND1092	d	ref	SWest	67	4	12/17/97	146	11	50.0	6	54.5	70.5	100.0	4.1	11.5	35.6	69.0	7.5	92.5	69.9	43.5	3.3	98.3	64.9
Indian Cr	IND01025	IND1199	d	ref	SWest	67	4	6/18/98	102	15	68.2	7	63.6	26.5	43.2	1.0	2.8	60.8	100.0	10.8	89.2	46.1	77.9	4.1	86.3	66.4
Jackson R	JKS03065	JKS1	d	ref	WCentral	67	4	11/3/94	149	19	86.4	14	100.0	6.7	11.0	61.7	100.0	39.6	76.7	3.4	96.6	45.0	79.5	2.4	100.0	81.3
Jackson R	JKS03065	JKS191	d	ref	WCentral	67	4	5/23/95	115	20	90.9	11	100.0	35.7	58.2	27.8	78.1	32.2	62.4	1.7	98.3	28.7	100.0	3.4	97.4	85.7
Jackson R	JKS03065	JKS372	d	ref	WCentral	67	4	12/4/95	132	18	81.8	9	81.8	22.0	35.9	22.0	61.7	49.2	95.4	0.0	100.0	31.8	98.5	3.7	93.2	81.0
Jackson R	JKS03065	JKS525	d	ref	WCentral	67	4	5/13/96	84	19	86.4	11	100.0	32.1	52.5	28.6	80.2	47.6	92.3	0.0	100.0	31.0	99.7	3.0	100.0	88.9
Jackson R	JKS03065	JKS734	d	ref	WCentral	67	4	11/6/96	98	14	63.6	9	81.8	16.3	26.7	16.3	45.8	62.2	100.0	0.0	100.0	46.9	76.6	4.2	85.5	72.5
Jackson R	JKS03065	JKS860	d	ref	WCentral	67	4	5/12/97	119	19	86.4	11	100.0	22.7	37.0	17.6	49.5	53.8	100.0	0.0	100.0	49.6	72.8	4.0	88.3	79.3
Jackson R	JKS03065	JKS862	d	ref	WCentral	67	4	6/20/97	87	19	86.4	9	81.8	35.6	58.2	9.2	25.8	36.8	71.3	1.1	98.9	32.2	98.0	4.3	83.4	75.5
Jackson R	JKS03065	JKS1027	d	ref	WCentral	67	4	10/7/97	128	15	68.2	8	72.7	16.4	26.8	31.3	87.7	37.5	72.7	0.0	100.0	41.4	84.6	4.3	83.6	74.5
Jackson R	JKS03065	JKS1180	d	ref	WCentral	67	4	6/1/98	94	17	77.3	8	72.7	19.1	31.3	22.3	62.7	33.0	63.9	6.4	93.6	40.4	86.1	3.8	91.0	72.3
Jackson R	JKS03065	JKS1330	d	ref	WCentral	67	4	11/24/98	111	19	86.4	11	100.0	29.7	48.5	25.2	70.8	20.7	40.2	0.0	100.0	34.2	95.0	3.5	95.8	79.6
Jackson R	JKS03065	JKS1386	v	ref	WCentral	67	4	3/8/99	129	16	72.7	9	81.8	30.2	49.4	27.9	78.3	14.7	28.5	5.4	94.6	34.1	95.2	3.7	93.0	74.2

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Jackson R	JKS03065	JKS1476	v	ref	WCentral	67	4	11/30/99	138	15	68.2	11	100.0	26.8	43.8	36.2	100.0	8.7	16.9	1.4	98.6	49.3	73.3	3.4	97.5	74.8
Jackson R	JKS03065	JKS1483	v	ref	WCentral	67	4	4/13/00	114	17	77.3	10	90.9	35.1	57.3	39.5	100.0	25.4	49.3	3.5	96.5	37.7	90.0	2.9	100.0	82.7
Jackson R	JKS03065	JKS1557	v	ref	WCentral	67	4	11/2/00	238	22	100.0	13	100.0	25.6	41.8	23.1	64.9	29.8	57.8	2.5	97.5	33.6	95.9	3.5	95.1	81.6
Jackson R	JKS03065	JKS1599	v	ref	WCentral	67	4	5/1/01	116	23	100.0	12	100.0	28.4	46.4	9.5	26.6	44.8	86.9	10.3	89.7	25.0	100.0	3.9	90.2	80.0
Jackson R	JKS03065	JKS1670	v	ref	WCentral	67	4	12/18/01	124	17	77.3	10	90.9	39.5	64.5	16.1	45.3	49.2	95.3	5.6	94.4	38.7	88.5	4.0	88.9	80.6
Jackson R	JKS06700	JKS61	d	ref	Valley	67	3	10/24/94	133	24	100.0	11	100.0	36.8	60.1	11.3	31.7	31.6	61.2	3.8	96.2	38.3	89.1	3.2	99.7	79.8
Jackson R	JKS06700	JKS237	d	ref	Valley	67	3	5/24/95	132	28	100.0	15	100.0	25.0	40.8	13.6	38.3	31.8	61.7	9.8	90.2	23.5	100.0	4.0	88.6	77.4
Jackson R	JKS06700	JKS971	d	ref	Valley	67	3	10/6/97	128	24	100.0	12	100.0	39.1	63.8	21.9	61.4	39.8	77.2	0.8	99.2	35.2	93.7	3.4	96.8	86.5
Jackson R	JKS06700	JKS1311	d	ref	Valley	67	3	10/7/98	143	12	54.5	7	63.6	26.6	43.4	20.3	56.9	46.9	90.8	6.3	93.7	36.4	91.9	4.0	87.9	72.9
Jackson R	JKS06700	JKS1410	v	ref	Valley	67	3	5/13/99	164	10	45.5	6	54.5	18.3	29.9	2.4	6.8	81.7	100.0	2.4	97.6	74.4	37.0	4.0	87.6	57.4
Jackson R	JKS06700	JKS2786	v	ref	Valley	67	3	5/2/00	109	14	63.6	8	72.7	32.1	52.4	16.5	46.4	41.3	80.0	8.3	91.7	34.9	94.1	3.8	91.3	74.0
Jackson R	JKS06700	JKS2842	v	ref	Valley	67	3	10/12/00	113	15	68.2	8	72.7	53.1	86.7	13.3	37.3	38.9	75.5	2.7	97.3	46.9	76.7	3.9	89.3	75.5
Jackson R	JKS08713	JKS553	d	ref	Valley	67	2	4/3/96	120	21	95.5	9	81.8	52.5	85.7	10.0	28.1	18.3	35.5	10.0	90.0	30.0	100.0	3.9	89.5	75.8
Jennings Cr	JNG00287	JNG1582	v	ref	WCentral	66	3	10/23/00	212	15	68.2	9	81.8	54.2	88.5	7.5	21.2	32.1	62.2	0.0	100.0	44.3	80.4	3.6	93.8	74.5
Johns Cr	JOB00102	JOB1612	v	ref	WCentral	67	4	4/20/01	172	20	90.9	8	72.7	23.8	38.9	14.5	40.8	44.8	86.8	20.9	79.1	37.2	90.7	4.1	86.2	73.3
Johns Cr	JOB00102	JOB1647	v	ref	WCentral	67	4	10/9/01	156	15	68.2	7	63.6	46.8	76.4	2.6	7.2	69.9	100.0	2.6	97.4	51.9	69.4	3.8	91.4	71.7
Johns Cr	JOB00117	JOB1186	d	ref	WCentral	67	4	6/3/98	101	17	77.3	8	72.7	16.8	27.5	12.9	36.1	41.6	80.6	9.9	90.1	43.6	81.5	4.3	84.0	68.7
Johns Cr	JOB00117	JOB1360	d	ref	WCentral	67	4	11/20/98	102	17	77.3	8	72.7	18.6	30.4	43.1	100.0	11.8	22.8	2.0	98.0	38.2	89.2	3.3	98.5	73.6
Johns Cr	JOB00117	JOB	v	ref	WCentral	67	4	6/2/99	93	15	68.2	8	72.7	18.3	29.8	29.0	81.5	40.9	79.2	4.3	95.7	49.5	73.0	3.8	91.0	73.9
Johns Cr	JOB00117	JOB1456	v	ref	WCentral	67	4	11/18/99	106	19	86.4	7	63.6	45.3	73.9	13.2	37.1	41.5	80.4	0.9	99.1	43.4	81.8	3.6	93.7	77.0
Johns Cr	JOB00117	JOB1489	v	ref	WCentral	67	4	5/1/00	95	16	72.7	8	72.7	18.9	30.9	11.6	32.5	15.8	30.6	6.3	93.7	49.5	73.0	4.7	78.0	60.5
Johns Cr	JOB00117	JOB1585	v	ref	WCentral	67	4	11/2/00	211	19	86.4	10	90.9	24.6	40.2	26.1	73.2	38.9	75.3	6.6	93.4	32.2	97.9	3.7	92.3	81.2
Kimberling Cr	KBL00724	KBL1084	d	ref	SWest	67	4	11/18/97	109	14	63.6	7	63.6	35.8	58.4	11.9	33.5	35.8	69.3	3.7	96.3	59.6	58.3	4.4	82.5	65.7
Kimberling Cr	KBL00724	KBL1193	d	ref	SWest	67	4	4/28/98	100	22	100.0	13	100.0	47.0	76.7	13.0	36.5	21.0	40.7	18.0	82.0	39.0	88.1	4.2	84.9	76.1
Kettle Run	KET01103	KET3032	v	ref	Northern	64	2	5/13/02	112	12	54.5	4	36.4	6.3	10.2	29.5	82.7	45.5	88.2	1.8	98.2	44.6	80.0	4.0	88.4	67.3
Laurel Cr	LAC00092	LAU114	d	ref	SWest	67	3	10/4/94	93	18	81.8	7	63.6	44.1	72.0	7.5	21.1	45.2	87.5	3.2	96.8	40.9	85.4	3.7	92.3	75.1
Laurel Cr	LAC00092	LAC489	d	ref	SWest	67	3	5/23/96	104	14	63.6	10	90.9	51.9	84.8	30.8	86.4	4.8	9.3	11.5	88.5	43.3	81.9	3.5	95.0	75.1
Laurel Cr	LAC00092	LAC648	d	ref	SWest	67	3	10/25/96	96	11	50.0	8	72.7	51.0	83.3	27.1	76.0	18.8	36.3	9.4	90.6	47.9	75.2	3.4	97.2	72.7
Laurel Cr	LAC00092	LAC1187	d	ref	SWest	67	3	5/19/98	110	16	72.7	10	90.9	46.4	75.7	19.1	53.6	29.1	56.4	8.2	91.8	32.7	97.2	3.4	97.3	79.5
Laurel Cr	LAE01329	LAE491	d	ref	SWest	67	3	6/18/96	115	15	68.2	9	81.8	17.4	28.4	34.8	97.6	4.3	8.4	23.5	76.5	36.5	91.7	3.9	88.9	67.7
Lick Cr	LIB00365	LIB492	d	ref	SWest	67	3	6/18/96	113	13	59.1	7	63.6	15.9	26.0	29.2	82.0	6.2	12.0	15.0	85.0	50.4	71.6	4.5	81.1	60.1
Lick Cr	LIB00365	LIB2885	v	ref	SWest	67	3	6/11/01	105	17	77.3	9	81.8	42.9	70.0	8.6	24.1	36.2	70.1	19.0	81.0	41.0	85.3	4.2	85.4	71.9
Little Indian Cr	LIC00473	LIC1595	v	ref	WCentral	66	1	4/18/01	113	18	81.8	9	81.8	31.0	50.6	10.6	29.8	11.5	22.3	31.9	68.1	54.9	65.2	4.7	77.8	59.7
Little Indian Cr	LIC00473	LIC1656	v	ref	WCentral	66	1	11/5/01	123	22	100.0	12	100.0	20.3	33.2	24.4	68.5	22.0	42.5	13.8	86.2	31.7	98.6	4.3	83.6	76.6
Little Indian Cr	LIC00473	LIC1659	v	ref	WCentral	66	1	11/5/01	120	20	90.9	11	100.0	10.8	17.7	23.3	65.5	25.8	50.1	23.3	76.7	38.3	89.1	4.4	82.4	71.5
Little Stony Cr	LRY00464	LRY1618	v	ref	WCentral	67	3	4/5/01	102	14	63.6	9	81.8	50.0	81.6	15.7	44.0	43.1	83.6	17.6	82.4	56.9	62.3	4.1	86.6	73.3
Little Stony Cr	LRY00464	LRY1619	v	ref	WCentral	67	3	4/5/01	100	13	59.1	10	90.9	64.0	100.0	12.0	33.7	45.0	87.2	13.0	87.0	55.0	65.0	4.0	88.9	76.5
Long Island Cr	LSD00123	LSD2734	v	ref	Valley	45	1	10/21/99	103	17	77.3	8	72.7	29.1	47.5	19.4	54.5	24.3	47.0	19.4	80.6	36.9	91.2	4.0	88.2	69.9
Long Island Cr	LSD00123	LSD2793	v	ref	Valley	45	1	5/10/00	125	19	86.4	10	90.9	33.6	54.8	12.0	33.7	20.0	38.8	23.2	76.8	40.0	86.7	4.6	79.7	68.5
Long Island Cr	LSD00123	LSD2849	v	ref	Valley	45	1	10/26/00	132	17	77.3	10	90.9	28.0	45.8	25.0	70.2	17.4	33.8	31.1	68.9	47.0	76.6	4.2	85.9	68.7
Long Island Cr	LSD00123	LSD2931	v	ref	Valley	45	1	9/28/01	102	15	68.2	8	72.7	33.3	54.4	7.8	22.0	44.1	85.5	10.8	89.2	38.2	89.2	4.2	85.1	70.8
Long Island Cr	LSD00123	LSD6368	v	ref	Valley	45	1	5/31/02	110	18	81.8	11	100.0	17.3	28.2	32.7	91.9	10.0	19.4	36.4	63.6	50.9	70.9	3.9	89.4	68.2
Little Back Cr	LTB00776	LTB63	d	ref	Valley	67	3	10/24/94	118	19	86.4	11	100.0	47.5	77.5	16.9	47.6	12.7	24.6	0.8	99.2	44.1	80.8	3.4	97.6	76.7
Little Back Cr	LTB00776	LTB241	d	ref	Valley	67	3	5/24/95	141	18	81.8	9	81.8	39.7	64.8	7.8	21.9	19.9	38.5	5.0	95.0	41.1	85.0	4.1	86.2	69.4
Little Back Cr	LTB00776	LTB977	d	ref	Valley	67	3	10/6/97	129	19	86.4	8	72.7	48.1	78.5	20.2	56.6	28.7	55.6	3.1	96.9	39.5	87.3	3.5	96.0	78.8
Lucky Run	LUC00095	LUC2990	v	ref	Northern	64	2	4/12/01	101	13	59.1	4	36.4	21.8	35.6	6.9	19.5	23.8	46.1	0.0	100.0	58.4	60.1	4.9	74.3	53.9
Lucky Run	LUC00095	LUC3003	v	ref	Northern	64	2	10/1/01	90	11	50.0	6	54.5	6.7	10.9	68.9	100.0	3.3	6.5	0.0	100.0	76.7	33.7	3.6	93.7	56.2
Little Walker Cr	LWK00077	LWK1615	v	ref		67		4/5/01	111	18	81.8	9	81.8	36.9	60.3	4.5	12.6	22.5	43.6	13.5	86.5	44.1	80.7	4.7	77.7	65.6
M.F.Holston	MFH03239	MFH1088	d	ref	SWest	67	4	10/23/97	106	11	50.0	6	54.5	41.5	67.8	1.9	5.3	61.3	100.0	3.8	96.2	56.6	62.7	3.8	90.9	65.9

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Mill Cr	MIO00035	MIO451	d	ref	Valley	66	2	10/18/95	112	24	100.0	14	100.0	25.9	42.3	27.7	77.7	34.8	67.5	7.1	92.9	31.3	99.3	3.6	94.7	84.3
Mill Cr	MIO00035	MIO1319	d	ref	Valley	66	2	10/13/98	113	17	77.3	13	100.0	27.4	44.8	26.5	74.5	42.5	82.3	3.5	96.5	42.5	83.1	3.5	96.1	81.8
Mill Cr	MIO00035	MIO2856	v	ref	Valley	66	2	10/19/00	105	14	63.6	11	100.0	21.9	35.8	17.1	48.1	16.2	31.4	55.2	44.8	68.6	45.4	4.6	80.1	56.1
North Buffalo Cr	NBF00252	NBF563	d	ref	Valley	67	2	5/2/96	151	22	100.0	9	81.8	29.8	48.6	12.6	35.3	13.9	27.0	32.5	67.5	48.3	74.6	4.8	76.8	64.0
NF Holston	NFH09847	NFH292	d	ref	SWest	67	4	4/11/95	109	17	77.3	9	81.8	11.9	19.5	9.2	25.8	33.9	65.8	15.6	84.4	43.1	82.2	4.7	78.1	64.3
NF Holston	NFH09847	NFH356	d	ref	SWest	67	4	11/27/95	118	12	54.5	7	63.6	17.8	29.1	3.4	9.5	87.3	100.0	1.7	98.3	83.1	24.5	4.0	88.8	58.5
NF Holston	NFH09847	NFH768	d	ref	SWest	67	4	5/22/97	121	12	54.5	6	54.5	18.2	29.7	1.7	4.6	41.3	80.1	28.1	71.9	58.7	59.7	4.8	76.8	54.0
NF Holston	NFH09847	NFH1089	d	ref	SWest	67	4	10/7/97	99	18	81.8	11	100.0	22.2	36.3	7.1	19.8	56.6	100.0	2.0	98.0	49.5	73.0	4.1	86.8	74.5
NF Holston	NFH09847	NFH1201	d	ref	SWest	67	4	6/29/98	97	15	68.2	8	72.7	20.6	33.7	7.2	20.3	59.8	100.0	9.3	90.7	50.5	71.5	4.0	88.5	68.2
NF Shenandoah	NFS10220	NFS235	d	ref	Valley	67	4	5/22/95	102	21	95.5	11	100.0	43.1	70.4	16.7	46.8	17.6	34.2	13.7	86.3	27.5	100.0	4.0	87.6	77.6
NF Shenandoah	NFS10220	NFS431	d	ref	Valley	67	4	10/30/95	106	24	100.0	9	81.8	28.3	46.2	24.5	68.9	20.8	40.2	1.9	98.1	26.4	100.0	3.7	92.1	78.4
NF Shenandoah	NFS10220	NFS564	d	ref	Valley	67	4	4/23/96	134	21	95.5	12	100.0	42.5	69.4	20.1	56.6	6.7	13.0	14.9	85.1	48.5	74.4	3.9	88.9	72.9
NF Shenandoah	NFS10220	NFS984	d	ref	Valley	67	4	9/22/97	137	17	77.3	6	54.5	35.0	57.2	5.8	16.4	31.4	60.8	3.6	96.4	62.0	54.8	4.4	81.9	62.4
NF Shenandoah	NFS10220	NFS1394	v	ref	Valley	67	4	5/18/99	144	15	68.2	8	72.7	67.4	100.0	7.6	21.4	6.3	12.1	14.6	85.4	49.3	73.2	4.0	87.5	65.1
NF Shenandoah	NFS10220	NFS2798	v	ref	Valley	67	4	4/24/00	136	12	54.5	7	63.6	72.8	100.0	0.0	0.0	2.2	4.3	14.0	86.0	67.6	46.7	4.5	81.3	54.6
NF Beaverdam	NOB00797	NOB2984	v	ref	Northern	64	1	7/9/01	96	8	36.4	4	36.4	21.9	35.7	6.3	17.5	34.4	66.6	0.0	100.0	75.0	36.1	4.9	74.4	50.4
NF Beaverdam	NOB00797	NOB2997	v	ref	Northern	64	1	11/26/01	93	11	50.0	5	45.5	33.3	54.4	10.8	30.2	43.0	83.4	0.0	100.0	61.3	55.9	4.4	83.0	62.8
North Cr	NRT00114	NRT1617	v	ref	WCentral	66	3	5/9/01	168	21	95.5	12	100.0	39.3	64.1	20.2	56.8	7.7	15.0	31.0	69.0	55.4	64.5	4.4	81.8	68.3
Ogle Cr	OGL00553	OGL1596	v	ref	WCentral	67	2	5/1/01	186	20	90.9	13	100.0	50.0	81.6	15.1	42.3	29.0	56.3	13.4	86.6	37.6	90.1	4.1	87.4	79.4
Ogle Cr	OGL00553	OGL1646	v	ref	WCentral	67	2	10/9/01	159	15	68.2	8	72.7	56.6	92.4	3.1	8.8	52.2	100.0	5.0	95.0	52.2	69.0	3.9	89.5	74.5
Peak Cr	PKC01111	PKC27	d	ref	WCentral	67	2	10/7/94	109	11	50.0	5	45.5	56.0	91.4	8.3	23.2	16.5	32.0	0.0	100.0	65.1	50.4	3.3	98.0	61.3
Peak Cr	PKC01111	PKC215	d	ref	WCentral	67	2	5/3/95	117	18	81.8	7	63.6	24.8	40.5	30.8	86.4	20.5	39.8	1.7	98.3	39.3	87.7	3.8	91.1	73.6
Peak Cr	PKC01111	PKC377	d	ref	WCentral	67	2	10/18/95	114	10	45.5	6	54.5	71.9	100.0	3.5	9.8	20.2	39.1	0.0	100.0	71.1	41.8	3.2	99.8	61.3
Peak Cr	PKC01111	PKC527	d	ref	WCentral	67	2	5/1/96	82	15	68.2	9	81.8	31.7	51.8	24.4	68.5	32.9	63.8	4.9	95.1	39.0	88.1	3.9	90.3	76.0
Peak Cr	PKC01111	PKC746	d	ref	WCentral	67	2	10/23/96	109	11	50.0	6	54.5	47.7	77.9	12.8	36.1	22.0	42.7	2.8	97.2	56.9	62.3	4.1	87.1	63.5
Peak Cr	PKC01111	PKC853	d	ref	WCentral	67	2	5/1/97	90	17	77.3	10	90.9	35.6	58.0	23.3	65.5	40.0	77.5	5.6	94.4	37.8	89.9	3.6	93.6	80.9
Peak Cr	PKC01111	PKC1036	d	ref	WCentral	67	2	10/9/97	128	11	50.0	5	45.5	48.4	79.1	18.0	50.4	43.8	84.8	0.8	99.2	56.3	63.2	4.0	88.3	70.1
Peak Cr	PKC01111	PKC1182	d	ref	WCentral	67	2	4/6/98	119	16	72.7	8	72.7	28.6	46.6	16.8	47.2	35.3	68.4	14.3	85.7	31.9	98.3	4.4	82.0	71.7
Peak Cr	PKC01111	PKC1354	d	ref	WCentral	67	2	10/13/98	103	11	50.0	5	45.5	41.7	68.1	39.8	100.0	15.5	30.1	1.0	99.0	69.9	43.5	3.2	99.9	67.0
Peak Cr	PKC01111	PKC1402	v	ref	WCentral	67	2	3/1/99	113	15	68.2	6	54.5	24.8	40.4	37.2	100.0	12.4	24.0	8.0	92.0	38.1	89.5	3.9	89.6	69.8
Peak Cr	PKC01111	PKC1452	v	ref	WCentral	67	2	11/3/99	101	7	31.8	4	36.4	56.4	92.1	24.8	69.5	21.8	42.2	1.0	99.0	59.4	58.6	3.4	96.8	65.8
Peak Cr	PKC01111	PKC1502	v	ref	WCentral	67	2	3/28/00	109	14	63.6	5	45.5	67.9	100.0	0.0	0.0	40.4	78.2	3.7	96.3	67.0	47.7	3.9	89.0	65.1
Phillips Cr	PLL00017	PLL2900	v	ref	SWest	69	2	6/25/01	98	11	50.0	5	45.5	24.5	40.0	34.7	97.4	21.4	41.5	6.1	93.9	48.0	75.2	3.6	93.4	67.1
Pounding Mill Cr	PMC00073	PMC1641	v	ref	WCentral	67	2	12/18/01	152	15	68.2	9	81.8	48.7	79.5	7.9	22.2	41.4	80.3	2.0	98.0	60.5	57.0	4.2	84.6	71.5
Potts Cr	POT03066	POT541	d	ref	WCentral	67	3	6/4/96	78	10	45.5	7	63.6	67.9	100.0	11.5	32.4	21.8	42.2	2.6	97.4	55.1	64.8	3.9	90.2	67.0
Potts Cr	POT03066	POT760	d	ref	WCentral	67	3	11/7/96	118	15	68.2	8	72.7	34.7	56.7	28.8	80.9	23.7	46.0	1.7	98.3	33.1	96.7	3.4	97.6	77.2
Potts Cr	POT03066	POT1048	d	ref	WCentral	67	3	10/22/97	110	16	72.7	9	81.8	53.6	87.6	9.1	25.5	37.3	72.2	1.8	98.2	52.7	68.3	3.7	93.0	74.9
Potts Cr	POT03066	POT1168	d	ref	WCentral	67	3	6/3/98	107	14	63.6	9	81.8	61.7	100.0	5.6	15.7	39.3	76.1	0.0	100.0	41.1	85.0	3.9	89.1	76.4
Potts Cr	POT03066	POT1362	d	ref	WCentral	67	3	11/24/98	110	16	72.7	6	54.5	49.1	80.1	10.0	28.1	33.6	65.2	7.3	92.7	49.1	73.5	3.5	95.1	70.3
Potts Cr	POT03066	POT	v	ref	WCentral	67	3	6/2/99	94	15	68.2	8	72.7	55.3	90.3	5.3	14.9	45.7	88.7	1.1	98.9	40.4	86.1	4.1	86.6	75.8
Potts Cr	POT03066	POT1457	v	ref	WCentral	67	3	11/18/99	99	17	77.3	9	81.8	50.5	82.4	10.1	28.4	39.4	76.3	8.1	91.9	48.5	74.4	3.7	91.9	75.6
Potts Cr	POT03066	POT1491	v	ref	WCentral	67	3	5/1/00	112	17	77.3	9	81.8	55.4	90.4	5.4	15.0	44.6	86.5	8.0	92.0	43.8	81.2	3.7	92.5	77.1
Potts Cr	POT03066	POT1584	v	ref	WCentral	67	3	11/2/00	207	12	54.5	8	72.7	58.9	96.2	14.5	40.7	26.6	51.5	0.0	100.0	55.6	64.2	3.3	98.8	72.3
Potts Cr	POT03066	POT1669	v	ref	WCentral	67	3	12/13/01	122	17	77.3	9	81.8	40.2	65.6	29.5	82.8	46.7	90.5	5.7	94.3	44.3	80.5	3.7	92.9	83.2
Passage Cr	PSG03024	PSG1430	v	ref	Valley	67	2	5/18/99	122	18	81.8	11	100.0	23.0	37.5	13.1	36.8	28.7	55.6	27.0	73.0	44.3	80.5	4.5	80.5	68.2
Passage Cr	PSG03024	PSG2742	v	ref	Valley	67	2	10/18/99	97	19	86.4	11	100.0	26.8	43.8	24.7	69.5	35.1	67.9	4.1	95.9	37.1	90.8	3.7	92.4	80.8
Passage Cr	PSG03024	PSG2805	v	ref	Valley	67	2	5/24/00	139	15	68.2	10	90.9	17.3	28.2	31.7	88.9	1.4	2.8	33.1	66.9	54.0	66.5	4.4	81.9	61.8
Passage Cr	PSG03024	PSG2865	v	ref	Valley	67	2	10/23/00	101	16	72.7	10	90.9	58.4	95.4	17.8	50.0	38.6	74.8	1.0	99.0	57.4	61.5	3.6	93.8	79.8
Passage Cr	PSG03024	PSG2948	v	ref	Valley	67	2	10/30/01	101	19	86.4	9	81.8	47.5	77.6	13.9	38.9	53.5	100.0	1.0	99.0	48.5	74.4	3.5	95.9	81.7

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Passage Cr	PSG03199	PSG48	d	ref	Valley	67	2	10/13/94	102	23	100.0	10	90.9	30.4	49.6	23.5	66.0	18.6	36.1	2.9	97.1	23.5	100.0	3.3	99.1	79.9
Passage Cr	PSG03199	PSG257	d	ref	Valley	67	2	5/22/95	101	23	100.0	12	100.0	27.7	45.3	21.8	61.1	16.8	32.6	9.9	90.1	23.8	100.0	3.4	96.3	78.2
Passage Cr	PSG03199	PSG435	d	ref	Valley	67	2	10/24/95	160	19	86.4	11	100.0	12.5	20.4	35.6	100.0	16.9	32.7	6.3	93.8	26.9	100.0	3.3	99.0	79.0
Passage Cr	PSG03199	PSG565	d	ref	Valley	67	2	5/23/96	99	17	77.3	9	81.8	27.3	44.5	20.2	56.7	22.2	43.1	4.0	96.0	28.3	100.0	3.4	97.1	74.6
Passage Cr	PSG03199	PSG986	d	ref	Valley	67	2	9/25/97	122	20	90.9	11	100.0	30.3	49.5	27.0	75.9	18.9	36.5	2.5	97.5	24.6	100.0	3.5	95.9	80.8
Passage Cr	PSG03199	PSG1303	d	ref	Valley	67	2	10/19/98	105	18	81.8	11	100.0	22.9	37.3	28.6	80.2	13.3	25.8	9.5	90.5	35.2	93.5	3.8	91.1	75.0
Passage Cr	PSG03199	PSG1396	v	ref	Valley	67	2	5/18/99	109	18	81.8	13	100.0	20.2	32.9	26.6	74.7	4.6	8.9	35.8	64.2	48.6	74.2	4.1	87.2	65.5
Passage Cr	PSG03199	PSG2743	v	ref	Valley	67	2	10/18/99	78	19	86.4	10	90.9	12.8	20.9	35.9	100.0	12.8	24.8	11.5	88.5	26.9	100.0	3.2	99.7	76.4
Passage Cr	PSG03199	PSG2806	v	ref	Valley	67	2	5/24/00	117	19	86.4	12	100.0	21.4	34.9	25.6	72.0	1.7	3.3	35.9	64.1	50.4	71.6	4.5	80.6	64.1
Passage Cr	PSG03199	PSG2866	v	ref	Valley	67	2	10/23/00	102	15	68.2	12	100.0	25.5	41.6	43.1	100.0	13.7	26.6	10.8	89.2	29.4	100.0	3.2	99.8	78.2
Rapidan R	RAP00376	RAP3028	v	ref	Northern	45	4	6/24/02	148	18	81.8	9	81.8	36.5	59.6	10.1	28.4	18.9	36.7	0.0	100.0	48.6	74.2	4.2	85.7	68.5
Rapidan R	RAP00653	RAP185	d	ref	Northern	45	4	4/28/94	127	24	100.0	8	72.7	23.6	38.6	23.6	66.3	26.8	51.9	1.6	98.4	26.8	100.0	3.6	94.1	77.8
Rapidan R	RAP00653	RAP181	d	ref	Northern	45	4	9/7/94	143	20	90.9	7	63.6	28.7	46.8	6.3	17.7	35.7	69.1	2.8	97.2	37.1	90.9	4.1	86.3	70.3
Rapidan R	RAP00653	RAP338	d	ref	Northern	45	4	4/20/95	165	23	100.0	7	63.6	37.6	61.3	12.7	35.7	42.4	82.2	3.0	97.0	33.3	96.3	4.0	88.3	78.1
Rapidan R	RAP00653	RAP455	d	ref	Northern	45	4	9/11/95	127	18	81.8	8	72.7	38.6	63.0	13.4	37.6	30.7	59.5	0.8	99.2	29.9	100.0	4.0	87.8	75.2
Rapidan R	RAP00653	RAP595	d	ref	Northern	45	4	5/10/96	148	22	100.0	8	72.7	35.1	57.4	15.5	43.6	23.6	45.8	3.4	96.6	26.4	100.0	3.9	89.0	75.6
Rapidan R	RAP00653	RAP660	d	ref	Northern	45	4	10/29/96	107	20	90.9	7	63.6	29.9	48.8	21.5	60.3	32.7	63.4	3.7	96.3	31.8	98.5	3.6	94.2	77.0
Rapidan R	RAP00653	RAP918	d	ref	Northern	45	4	4/17/97	220	21	95.5	7	63.6	46.4	75.7	11.4	31.9	27.3	52.9	5.0	95.0	42.3	83.4	4.1	86.3	73.0
Rapidan R	RAP00653	RAP930	d	ref	Northern	45	4	9/2/97	134	21	95.5	8	72.7	29.1	47.5	23.1	64.9	32.1	62.2	1.5	98.5	24.6	100.0	3.6	94.0	79.4
Rapidan R	RAP00653	RAP1233	d	ref	Northern	45	4	6/30/98	183	21	95.5	8	72.7	34.4	56.2	12.6	35.3	17.5	33.9	4.4	95.6	27.3	100.0	4.3	84.2	71.7
Rapidan R	RAP00653	RAP1259	d	ref	Northern	45	4	9/14/98	195	22	100.0	7	63.6	28.7	46.9	8.2	23.0	28.7	55.7	1.5	98.5	28.2	100.0	4.3	83.1	71.4
Rapidan R	RAP00653	RAP1394	v	ref	Northern	45	4	4/27/99	238	20	90.9	7	63.6	36.1	59.0	11.8	33.0	43.7	84.7	3.4	96.6	48.7	74.0	3.8	90.6	74.1
Rapidan R	RAP00653	RAP1417	v	ref	Northern	45	4	4/27/99	238	20	90.9	7	63.6	36.1	59.0	11.8	33.0	43.7	84.7	0.0	100.0	48.7	74.0	3.9	90.1	74.4
Rapidan R	RAP00653	RAP1437	v	ref	Northern	45	4	10/18/99	174	18	81.8	8	72.7	9.2	15.0	13.8	38.7	36.2	70.2	1.1	98.9	32.2	98.0	4.0	88.3	70.5
Rapidan R	RAP00653	RAP2784	v	ref	Northern	45	4	3/15/00	228	18	81.8	8	72.7	36.0	58.7	13.6	38.2	35.1	68.0	6.1	93.9	40.8	85.5	4.1	87.3	73.3
Rapidan R	RAP00653	RAP2800	v	ref	Northern	45	4	9/13/00	196	20	90.9	8	72.7	28.1	45.8	10.7	30.1	24.5	47.5	0.0	100.0	27.0	100.0	4.0	87.6	71.8
Rapidan R	RAP08243	RAP1399	v	ref	Northern	66	2	4/26/99	148	18	81.8	11	100.0	37.8	61.8	44.6	100.0	37.2	72.0	0.7	99.3	34.5	94.7	2.2	100.0	88.7
Rapidan R	RAP08243	RAP1434	v	ref	Northern	66	2	12/2/99	124	15	68.2	10	90.9	37.9	61.9	47.6	100.0	25.0	48.4	0.8	99.2	36.3	92.0	2.1	100.0	82.6
Rapidan R	RAP08243	RAP2782	v	ref	Northern	66	2	5/26/00	179	16	72.7	10	90.9	44.7	73.0	34.6	97.2	43.0	83.4	0.0	100.0	39.1	88.0	2.4	100.0	88.1
Rapidan R	RAP08243	RAP2808	v	ref	Northern	66	2	9/27/00	167	17	77.3	10	90.9	40.1	65.5	42.5	100.0	28.7	55.7	0.0	100.0	40.1	86.5	2.1	100.0	84.5
Rapidan R	RAP08243	RAP2972	v	ref	Northern	66	2	5/2/01	118	16	72.7	10	90.9	38.1	62.3	33.9	95.2	28.0	54.2	0.0	100.0	36.4	91.8	2.7	100.0	83.4
Rapidan R	RAP08243	RAP3007	v	ref	Northern	66	2	9/26/01	106	16	72.7	11	100.0	27.4	44.7	50.9	100.0	31.1	60.3	0.0	100.0	35.8	92.7	2.3	100.0	83.8
Rapidan R	RAP08243	RAP3023	v	ref	Northern	66	2	4/15/02	103	14	63.6	10	90.9	28.2	46.0	59.2	100.0	15.5	30.1	0.0	100.0	58.3	60.3	2.3	100.0	73.9
Reed Cr	RDC03383	RDC1085	d	ref	SWest	66	4	12/16/97	140	21	95.5	14	100.0	47.9	78.1	16.4	46.1	32.1	62.3	12.1	87.9	32.1	98.0	4.0	88.7	82.1
Reed Cr	RDC04487	REE118	d	ref	SWest	67	4	11/14/94	121	13	59.1	6	54.5	28.9	47.2	37.2	100.0	45.5	88.1	9.1	90.9	37.2	90.7	3.4	97.3	78.5
Big Reed Island (	RIC00295	RIC1111	d	ref	SWest	66	4	11/17/97	95	16	72.7	11	100.0	14.7	24.1	25.3	70.9	40.0	77.5	15.8	84.2	36.8	91.2	4.1	86.9	76.0
Big Reed Island (	RIC03408	BRI136	d	ref	SWest	66	4	11/7/94	95	17	77.3	11	100.0	10.5	17.2	14.7	41.4	51.6	100.0	2.1	97.9	50.5	71.5	4.0	88.0	74.2
Big Reed Island (	RIC03408	RIC514	d	ref	SWest	66	4	4/25/96	113	19	86.4	10	90.9	23.0	37.6	14.2	39.7	28.3	54.9	15.9	84.1	27.4	100.0	4.4	81.7	71.9
Roanoke R	ROA22454	ROA204	d	ref	WCentral	67	4	5/4/95	121	12	54.5	6	54.5	66.1	100.0	0.8	2.3	28.1	54.5	0.0	100.0	48.8	74.0	4.1	86.7	65.8
Roanoke R	ROA22454	ROA386	d	ref	WCentral	67	4	10/26/95	114	10	45.5	5	45.5	36.8	60.1	7.9	22.2	7.0	13.6	0.0	100.0	78.1	31.7	4.1	86.6	50.6
Roanoke R	ROA22454	ROA537	d	ref	WCentral	67	4	5/8/96	104	10	45.5	6	54.5	79.8	100.0	1.0	2.7	10.6	20.5	0.0	100.0	71.2	41.7	4.2	85.3	56.3
Roanoke R	ROA22454	ROA753	d	ref	WCentral	67	4	10/16/96	104	12	54.5	7	63.6	53.8	87.9	1.9	5.4	3.8	7.5	8.7	91.3	51.9	69.4	4.5	81.2	57.6
Roanoke R	ROA22454	ROA870	d	ref	WCentral	67	4	5/8/97	92	11	50.0	7	63.6	75.0	100.0	2.2	6.1	13.0	25.3	4.3	95.7	47.8	75.4	3.8	91.7	63.5
Roanoke R	ROA22454	ROA1161	d	ref	WCentral	67	4	5/26/98	91	16	72.7	7	63.6	19.8	32.3	12.1	33.9	41.8	80.9	4.4	95.6	36.3	92.1	4.1	87.2	69.8
Roanoke R	ROA22454	ROA1345	d	ref	WCentral	67	4	11/4/98	105	9	40.9	4	36.4	54.3	88.6	1.9	5.3	7.6	14.8	0.0	100.0	75.2	35.8	3.2	99.2	52.6
Roanoke R	ROA22454	ROA1413	v	ref	WCentral	67	4	3/29/99	83	19	86.4	11	100.0	44.6	72.8	20.5	57.5	7.2	14.0	3.6	96.4	50.6	71.4	3.9	90.3	73.6
Roanoke R	ROA22454	ROA1473	v	ref	WCentral	67	4	10/28/99	103	18	81.8	10	90.9	44.7	72.9	7.8	21.8	33.0	64.0	6.8	93.2	62.1	54.7	3.4	96.7	72.0
Roanoke R	ROA22454	ROA1515	v	ref	WCentral	67	4	5/8/00	89	14	63.6	7	63.6	33.7	55.0	4.5	12.6	42.7	82.7	14.6	85.4	37.1	90.9	4.3	83.2	67.2
Roanoke R	ROA22454	ROA1566	v	ref	WCentral	67	4	10/12/00	245	21	95.5	9	81.8	34.7	56.6	3.3	9.2	40.0	77.5	7.8	92.2	51.0	70.7	3.9	89.8	71.7

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Roanoke R	ROA22454	ROA1651	v	ref	WCentral	67	4	11/26/01	102	16	72.7	8	72.7	16.7	27.2	14.7	41.3	35.3	68.4	23.5	76.5	46.1	77.9	4.4	82.8	64.9
Robinson R	ROB00190	ROB165	d	ref	Northern	64	3	10/17/94	106	18	81.8	6	54.5	37.7	61.6	14.2	39.7	26.4	51.2	0.9	99.1	35.8	92.7	4.2	84.7	70.7
Robinson R	ROB00190	ROB346	d	ref	Northern	64	3	5/16/95	106	18	81.8	7	63.6	59.4	97.0	14.2	39.7	31.1	60.3	3.8	96.2	50.0	72.2	3.6	93.9	75.6
Robinson R	ROB00190	ROB466	d	ref	Northern	64	3	10/2/95	120	23	100.0	9	81.8	27.5	44.9	22.5	63.2	25.8	50.1	0.8	99.2	25.8	100.0	4.0	88.3	78.4
Robinson R	ROB00190	ROB586	d	ref	Northern	64	3	5/16/96	131	17	77.3	7	63.6	48.9	79.7	12.2	34.3	16.8	32.5	4.6	95.4	36.6	91.5	3.7	92.8	70.9
Robinson R	ROB00190	ROB667	d	ref	Northern	64	3	11/26/96	109	16	72.7	7	63.6	40.4	65.9	16.5	46.4	25.7	49.8	1.8	98.2	45.0	79.5	3.7	92.1	71.0
Robinson R	ROB00190	ROB915	d	ref	Northern	64	3	4/7/97	109	16	72.7	7	63.6	69.7	100.0	7.3	20.6	27.5	53.3	2.8	97.2	63.3	53.0	4.0	88.3	68.6
Robinson R	ROB00190	ROB933	d	ref	Northern	64	3	10/6/97	150	22	100.0	9	81.8	19.3	31.6	27.3	76.7	12.7	24.5	5.3	94.7	33.3	96.3	4.0	88.5	74.3
Robinson R	ROB00190	ROB1213	d	ref	Northern	64	3	5/28/98	117	18	81.8	10	90.9	49.6	80.9	21.4	60.0	20.5	39.8	2.6	97.4	35.9	92.6	3.4	96.7	80.0
Robinson R	ROB00190	ROB1258	d	ref	Northern	64	3	9/17/98	191	19	86.4	7	63.6	38.7	63.2	7.9	22.0	19.9	38.6	2.1	97.9	40.8	85.5	4.4	81.7	67.4
Robinson R	ROB00190	ROB1405	v	ref	Northern	64	3	5/12/99	270	22	100.0	9	81.8	56.3	91.9	8.5	23.9	17.8	34.5	1.9	98.1	43.3	81.9	3.8	91.3	75.4
Robinson R	ROB00190	ROB1420	v	ref	Northern	64	3	10/13/99	141	16	72.7	9	81.8	53.2	86.8	27.7	77.6	21.3	41.2	0.7	99.3	45.4	78.9	3.1	100.0	79.8
Robinson R	ROB00190	ROB2774	v	ref	Northern	64	3	5/1/00	249	20	90.9	7	63.6	63.1	100.0	3.6	10.1	20.1	38.9	1.6	98.4	51.8	69.6	3.5	95.9	70.9
Robinson R	ROB00190	ROB2794	v	ref	Northern	64	3	11/13/00	151	17	77.3	7	63.6	54.3	88.6	8.6	24.2	24.5	47.5	0.0	100.0	53.0	67.9	3.7	92.5	70.2
Robinson R	ROB02256	ROB173	d	ref	Northern	64	2	10/17/94	128	18	81.8	8	72.7	39.1	63.8	17.2	48.2	14.8	28.8	0.8	99.2	32.0	98.2	3.8	91.2	73.0
Robinson R	ROB02256	ROB341	d	ref	Northern	64	2	5/5/95	131	24	100.0	12	100.0	46.6	76.0	26.7	75.0	21.4	41.4	0.8	99.2	36.6	91.5	3.3	98.0	85.2
Robinson R	ROB02256	ROB452	d	ref	Northern	64	2	10/20/95	156	18	81.8	7	63.6	25.6	41.9	9.0	25.2	12.2	23.6	1.9	98.1	54.5	65.7	4.8	76.8	59.6
Robinson R	ROB02256	ROB588	d	ref	Northern	64	2	5/16/96	153	17	77.3	9	81.8	61.4	100.0	12.4	34.9	16.3	31.7	2.0	98.0	51.6	69.9	3.9	89.4	72.9
Robinson R	ROB02256	ROB656	d	ref	Northern	64	2	10/22/96	142	14	63.6	6	54.5	43.0	70.1	14.1	39.5	21.1	40.9	1.4	98.6	40.8	85.4	3.9	89.1	67.7
Robinson R	ROB02256	ROB922	d	ref	Northern	64	2	4/30/97	199	12	54.5	6	54.5	44.2	72.2	13.6	38.1	18.1	35.1	3.0	97.0	47.7	75.5	4.2	85.3	64.0
Robinson R	ROB02256	ROB939	d	ref	Northern	64	2	10/19/97	202	16	72.7	7	63.6	36.1	59.0	13.9	38.9	16.3	31.7	1.0	99.0	46.0	77.9	4.4	82.9	65.7
Robinson R	ROB02256	ROB1226	d	ref	Northern	64	2	3/31/98	160	17	77.3	8	72.7	63.1	100.0	10.0	28.1	49.4	95.7	1.3	98.8	58.8	59.6	4.1	86.8	77.4
Robinson R	ROB02256	ROB1267	d	ref	Northern	64	2	10/13/98	186	19	86.4	11	100.0	49.5	80.7	12.4	34.7	22.6	43.8	1.6	98.4	48.4	74.6	3.8	91.4	76.2
Robinson R	ROB02256	ROB1416	v	ref	Northern	64	2	4/19/99	214	19	86.4	9	81.8	63.6	100.0	9.8	27.5	28.0	54.3	2.3	97.7	51.4	70.2	3.5	96.2	76.8
Robinson R	ROB02256	ROB1435	v	ref	Northern	64	2	10/5/99	107	15	68.2	6	54.5	27.1	44.2	11.2	31.5	16.8	32.6	5.6	94.4	37.4	90.4	4.4	83.0	62.4
Robinson R	ROB02256	ROB2783	v	ref	Northern	64	2	4/12/00	373	10	45.5	4	36.4	89.8	100.0	0.0	0.0	6.7	13.0	0.8	99.2	83.6	23.6	4.0	88.6	50.8
Robinson R	ROB02256	ROB2807	v	ref	Northern	64	2	9/27/00	148	17	77.3	7	63.6	31.8	51.8	27.0	75.9	9.5	18.3	0.0	100.0	45.3	79.1	3.5	95.5	70.2
Robinson R	ROB02256	ROB2977	v	ref	Northern	64	2	5/16/01	106	10	45.5	9	81.8	86.8	100.0	6.6	18.5	14.2	27.4	0.0	100.0	71.7	40.9	3.3	97.9	64.0
Robinson R	ROB02256	ROB2998	v	ref	Northern	64	2	9/26/01	93	14	63.6	9	81.8	63.4	100.0	8.6	24.1	17.2	33.3	1.1	98.9	60.2	57.5	3.1	100.0	69.9
Robinson R	ROB02256	ROB3030	v	ref	Northern	64	2	5/1/02	99	10	45.5	7	63.6	66.7	100.0	15.2	42.5	30.3	58.7	0.0	100.0	53.5	67.1	3.7	92.5	71.3
Rappahannock R	RPP13267	RPP923	d	ref	Northern	45	4	5/7/97	246	19	86.4	7	63.6	64.6	100.0	9.8	27.4	22.4	43.3	1.2	98.8	49.2	73.4	3.7	92.9	73.2
Rappahannock R	RPP13267	RPP944	d	ref	Northern	45	4	8/18/97	173	18	81.8	7	63.6	35.8	58.5	15.0	42.2	28.3	54.9	2.3	97.7	31.2	99.4	4.0	88.7	73.4
Rappahannock R	RPP13267	RPP1228	d	ref	Northern	45	4	7/16/98	191	24	100.0	9	81.8	37.7	61.5	16.2	45.6	30.9	59.9	2.1	97.9	32.5	97.6	3.8	91.4	79.5
Rappahannock R	RPP13267	RPP1260	d	ref	Northern	45	4	9/9/98	182	20	90.9	8	72.7	26.4	43.1	8.2	23.1	26.9	52.2	6.6	93.4	27.5	100.0	4.6	79.8	69.4
Rappahannock R	RPP13267	RPP1406	v	ref	Northern	45	4	5/11/99	212	22	100.0	8	72.7	43.9	71.6	20.8	58.3	22.2	43.0	0.5	99.5	40.6	85.8	3.2	100.0	78.9
Rappahannock R	RPP13267	RPP1440	v	ref	Northern	45	4	9/23/99	153	15	68.2	6	54.5	42.5	69.3	18.3	51.4	32.0	62.1	1.3	98.7	37.9	89.7	3.4	97.3	73.9
Rappahannock R	RPP14710	RPP914	d	ref	Northern	64	4	5/12/97	276	18	81.8	8	72.7	66.7	100.0	16.3	45.8	13.4	26.0	1.4	98.6	54.3	65.9	3.2	100.0	73.8
Rappahannock R	RPP14710	RPP943	d	ref	Northern	64	4	8/18/97	176	17	77.3	8	72.7	37.5	61.2	39.8	100.0	17.6	34.1	0.6	99.4	35.2	93.6	2.8	100.0	79.8
Rappahannock R	RPP14710	RPP1216	d	ref	Northern	64	4	6/30/98	225	21	95.5	8	72.7	51.1	83.4	22.2	62.4	19.6	37.9	4.4	95.6	49.3	73.2	2.9	100.0	77.6
Rappahannock R	RPP14710	RPP1257	d	ref	Northern	64	4	9/21/98	223	21	95.5	8	72.7	22.9	37.3	29.1	81.8	13.5	26.1	2.7	97.3	35.9	92.6	3.6	93.4	74.6
Rappahannock R	RPP14710	RPP1407	v	ref	Northern	64	4	5/11/99	278	21	95.5	9	81.8	54.0	88.1	29.1	81.8	10.1	19.5	1.4	98.6	56.5	62.9	2.6	100.0	78.5
Rappahannock R	RPP14710	RPP1439	v	ref	Northern	64	4	9/13/99	206	20	90.9	6	54.5	42.2	68.9	21.4	60.0	24.3	47.0	4.4	95.6	42.2	83.4	3.2	100.0	75.1
Rappahannock R	RPP14710	RPP2786	v	ref	Northern	64	4	5/8/00	273	21	95.5	9	81.8	64.8	100.0	12.5	35.0	13.2	25.6	2.2	97.8	53.8	66.7	3.3	98.8	75.1
Rappahannock R	RPP14710	RPP2804	v	ref	Northern	64	4	9/6/00	240	20	90.9	9	81.8	27.1	44.2	19.6	55.0	9.6	18.6	1.3	98.8	45.0	79.4	4.5	81.6	68.8
Rappahannock R	RPP14710	RPP2980	v	ref	Northern	64	4	6/19/01	111	14	63.6	9	81.8	61.3	100.0	19.8	55.6	13.5	26.2	0.0	100.0	62.2	54.7	2.5	100.0	72.7
Rappahannock R	RPP14710	RPP3013	v	ref	Northern	64	4	9/10/01	111	16	72.7	10	90.9	18.0	29.4	37.8	100.0	9.0	17.5	0.9	99.1	49.5	72.9	3.6	93.5	72.0
Rappahannock R	RPP14710	RPP3027	v	ref	Northern	64	4	4/8/02	107	13	59.1	8	72.7	46.7	76.3	28.0	78.7	10.3	19.9	0.0	100.0	52.3	68.8	3.9	90.2	70.7
Rappahannock R	RPP15032	RPP951	d	ref	Northern	64	3	8/18/97	218	20	90.9	8	72.7	26.6	43.4	39.0	100.0	18.8	36.4	0.9	99.1	40.4	86.1	3.0	100.0	78.6
Rappahannock R	RPP15032	RPP1236	d	ref	Northern	64	3	6/30/98	150	18	81.8	7	63.6	26.7	43.5	20.0	56.1	16.7	32.3	2.0	98.0	36.7	91.5	3.9	90.2	69.6

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Rappahannock R	RPP15032	RPP1262	d	ref	Northern	64	3	9/23/98	164	19	86.4	7	63.6	26.2	42.8	36.6	100.0	13.4	26.0	1.2	98.8	36.0	92.5	3.2	100.0	76.3
Rappahannock R	RPP15032	RPP1401	v	ref	Northern	64	3	4/28/99	257	25	100.0	8	72.7	48.2	78.8	7.0	19.7	17.9	34.7	1.2	98.8	44.4	80.4	4.4	82.9	71.0
Rappahannock R	RPP15032	RPP1422	v	ref	Northern	64	3	9/13/99	170	22	100.0	7	63.6	15.3	25.0	26.5	74.3	31.8	61.6	1.2	98.8	32.9	96.9	3.8	91.2	76.4
Rappahannock R	RPP15032	RPP2787	v	ref	Northern	64	3	5/9/00	317	21	95.5	7	63.6	66.6	100.0	0.0	0.0	17.7	34.2	0.6	99.4	56.5	62.9	3.1	100.0	69.4
Rappahannock R	RPP15032	RPP2806	v	ref	Northern	64	3	9/6/00	248	18	81.8	8	72.7	33.1	54.0	37.1	100.0	11.3	21.9	1.6	98.4	40.7	85.6	2.9	100.0	76.8
Rappahannock R	RPP15032	RPP2975	v	ref	Northern	64	3	5/10/01	97	9	40.9	6	54.5	25.8	42.1	64.9	100.0	6.2	12.0	0.0	100.0	77.3	32.8	1.9	100.0	60.3
Rappahannock R	RPP15032	RPP3012	v	ref	Northern	64	3	9/17/01	102	16	72.7	6	54.5	22.5	36.8	34.3	96.3	28.4	55.1	1.0	99.0	45.1	79.3	3.3	99.0	74.1
Rappahannock R	RPP15032	RPP3022	v	ref	Northern	64	3	4/8/02	110	13	59.1	7	63.6	48.2	78.7	32.7	91.9	10.0	19.4	0.0	100.0	59.1	59.1	3.3	97.9	71.2
Rappahannock R	RPP18659	RPP3021	v	ref	Northern	64	2	4/10/02	105	15	68.2	10	90.9	41.9	68.4	17.1	48.1	14.3	27.7	2.9	97.1	44.8	79.8	4.1	86.4	70.8
Rocky Row Run	RRW00014	RRW1597	v	ref	WCentral	66	2	4/3/01	106	17	77.3	11	100.0	41.5	67.8	14.2	39.7	27.4	53.0	29.2	70.8	55.7	64.0	4.5	80.4	69.1
Roses Cr	RSE00987	RSE144	d	ref	Piedmont	45	1	11/14/94	58	14	63.6	5	45.5	39.7	64.7	12.1	33.9	31.0	60.1	17.2	82.8	39.7	87.2	3.9	89.9	66.0
Roses Cr	RSE00987	RSE323	d	ref	Piedmont	45	1	5/5/95	34	10	45.5	3	27.3	20.6	33.6	14.7	41.3	29.4	57.0	29.4	70.6	44.1	80.7	4.2	84.7	55.1
Roses Cr	RSE00987	RSE727	d	ref	Piedmont	45	1	10/25/96	71	13	59.1	3	27.3	19.7	32.2	0.0	0.0	18.3	35.5	14.1	85.9	39.4	87.5	5.4	68.1	49.4
Roses Cr	RSE00987	RSE840	d	ref	Piedmont	45	1	5/30/97	82	15	68.2	7	63.6	13.4	21.9	15.9	44.5	12.2	23.6	28.0	72.0	46.3	77.5	5.1	71.9	55.4
Roses Cr	RSE00987	RSE1130	d	ref	Piedmont	45	1	11/18/97	76	14	63.6	7	63.6	21.1	34.4	14.5	40.6	18.4	35.7	26.3	73.7	42.1	83.6	4.3	83.5	59.9
Roses Cr	RSE00987	RSE1239	d	ref	Piedmont	45	1	5/15/98	51	8	36.4	2	18.2	5.9	9.6	3.9	11.0	11.8	22.8	19.6	80.4	62.7	53.8	5.0	72.9	38.1
Shoemaker R	SMK00173	SMK992	d	ref	Valley	67	3	9/22/97	108	19	86.4	8	72.7	20.4	33.3	13.0	36.4	16.7	32.3	3.7	96.3	32.4	97.6	4.5	80.8	67.0
St. Marys R	SMR00480	SMR2881	v	ref	Valley	66	2	5/29/01	111	16	72.7	10	90.9	9.9	16.2	43.2	100.0	15.3	29.7	15.3	84.7	36.0	92.4	3.5	94.9	72.7
St. Marys R	SMR00480	SMR2893	v	ref	Valley	66	2	10/17/01	96	11	50.0	9	81.8	47.9	78.2	26.0	73.1	47.9	92.9	0.0	100.0	66.7	48.1	3.9	90.3	76.8
Stony Cr	SNC00504	SNC35	d	ref	WCentral	67	3	10/13/94	105	11	50.0	8	72.7	45.7	74.6	29.5	82.9	10.5	20.3	0.0	100.0	30.5	100.0	2.9	100.0	75.1
Stony Cr	SNC00504	SNC218	d	ref	WCentral	67	3	5/2/95	77	13	59.1	8	72.7	62.3	100.0	18.2	51.0	24.7	47.8	1.3	98.7	58.4	60.0	3.0	100.0	73.7
Stony Cr	SNC00504	SNC380	d	ref	WCentral	67	3	11/17/95	91	12	54.5	8	72.7	41.8	68.2	22.0	61.7	5.5	10.6	1.1	98.9	63.7	52.4	3.3	98.0	64.6
Stony Cr	SNC00504	SNC521	d	ref	WCentral	67	3	5/2/96	95	12	54.5	8	72.7	42.1	68.7	23.2	65.0	16.8	32.6	18.9	81.1	37.9	89.7	4.1	86.2	68.8
Stony Cr	SNC00504	SNC743	d	ref	WCentral	67	3	11/5/96	114	15	68.2	12	100.0	43.9	71.6	32.5	91.1	10.5	20.4	0.0	100.0	43.9	81.1	2.8	100.0	79.0
Stony Cr	SNC00504	SNC871	d	ref	WCentral	67	3	5/6/97	120	14	63.6	8	72.7	51.7	84.3	23.3	65.5	33.3	64.6	7.5	92.5	46.7	77.0	3.8	91.8	76.5
Stony Cr	SNC00504	SNC1040	d	ref	WCentral	67	3	10/14/97	119	15	68.2	9	81.8	44.5	72.7	23.5	66.0	11.8	22.8	0.0	100.0	39.5	87.4	3.3	99.2	74.8
Stony Cr	SNC00504	SNC1178	d	ref	WCentral	67	3	4/29/98	101	14	63.6	9	81.8	69.3	100.0	13.9	38.9	55.4	100.0	0.0	100.0	62.4	54.3	3.6	94.1	79.1
Stony Cr	SNC00504	SNC1356	d	ref	WCentral	67	3	11/4/98	105	18	81.8	13	100.0	23.8	38.9	36.2	100.0	8.6	16.6	3.8	96.2	40.0	86.7	3.7	93.2	76.7
Stony Cr	SNC00504	SNC1410	v	ref	WCentral	67	3	3/17/99	135	17	77.3	13	100.0	53.3	87.1	28.1	79.0	32.6	63.2	3.7	96.3	45.2	79.2	3.1	100.0	85.2
Stony Cr	SNC00504	SNC1466	v	ref	WCentral	67	3	11/17/99	145	17	77.3	12	100.0	58.6	95.7	29.0	81.3	7.6	14.7	1.4	98.6	51.7	69.7	2.5	100.0	79.7
Stony Cr	SNC00504	SNC1509	v	ref	WCentral	67	3	4/11/00	102	17	77.3	12	100.0	38.2	62.4	35.3	99.1	19.6	38.0	2.9	97.1	30.4	100.0	3.0	100.0	84.2
Stony Cr	SNC00504	SNC1554	v	ref	WCentral	67	3	11/9/00	237	19	86.4	12	100.0	39.2	64.1	36.3	100.0	17.3	33.5	3.4	96.6	32.5	97.5	3.1	100.0	84.8
Sinking Cr	SNK01206	SNK32	d	ref	WCentral	67	3	10/12/94	122	20	90.9	8	72.7	52.5	85.6	8.2	23.0	31.1	60.4	0.8	99.2	39.3	87.6	3.6	94.6	76.8
Sinking Cr	SNK01206	SNK212	d	ref	WCentral	67	3	5/19/95	147	20	90.9	12	100.0	61.9	100.0	12.9	36.3	27.2	52.7	0.0	100.0	35.4	93.3	3.1	100.0	84.2
Sinking Cr	SNK01206	SNK379	d	ref	WCentral	67	3	11/12/95	120	15	68.2	7	63.6	56.7	92.5	15.8	44.4	26.7	51.7	0.8	99.2	53.3	67.4	3.3	98.7	73.2
Sinking Cr	SNK01206	SNK536	d	ref	WCentral	67	3	6/6/96	103	17	77.3	10	90.9	64.1	100.0	8.7	24.5	28.2	54.6	4.9	95.1	39.8	86.9	3.8	91.0	77.6
Sinking Cr	SNK01206	SNK749	d	ref	WCentral	67	3	10/15/96	94	13	59.1	6	54.5	38.3	62.5	6.4	17.9	30.9	59.8	3.2	96.8	53.2	67.6	3.8	91.6	63.7
Sinking Cr	SNK01206	SNK875	d	ref	WCentral	67	3	5/7/97	113	17	77.3	9	81.8	63.7	100.0	7.1	19.9	21.2	41.2	1.8	98.2	58.4	60.1	4.1	87.4	70.7
Sinking Cr	SNK01206	SNK1034	d	ref	WCentral	67	3	10/14/97	156	14	63.6	8	72.7	59.0	96.3	7.1	19.8	32.7	63.4	3.2	96.8	48.7	74.1	3.5	95.5	72.8
Sinking Cr	SNK01206	SNK1162	d	ref	WCentral	67	3	5/21/98	114	15	68.2	8	72.7	58.8	95.9	22.8	64.0	14.0	27.2	2.6	97.4	50.9	71.0	3.8	91.4	73.5
Sinking Cr	SNK01206	SNK1417	v	ref	WCentral	67	3	3/11/99	139	19	86.4	10	90.9	46.8	76.3	17.3	48.5	25.9	50.2	7.2	92.8	32.4	97.7	3.6	93.8	79.6
Sinking Cr	SNK01206	SNK1458	v	ref	WCentral	67	3	11/2/99	111	14	63.6	8	72.7	50.5	82.4	18.9	53.1	37.8	73.3	1.8	98.2	45.9	78.1	3.4	97.2	77.3
Sinking Cr	SNK01206	SNK1493	v	ref	WCentral	67	3	4/27/00	118	19	86.4	11	100.0	56.8	92.7	12.7	35.7	19.5	37.8	1.7	98.3	43.2	82.0	3.7	92.8	78.2
Sinking Cr	SNK01206	SNK1551	v	ref	WCentral	67	3	11/6/00	289	22	100.0	12	100.0	54.3	88.7	16.6	46.6	41.5	80.5	2.4	97.6	50.5	71.5	3.5	95.2	85.0
Snow Cr	SNO00035	SNO1671	v	ref	WCentral	66	1	2/5/02	106	20	90.9	13	100.0	26.4	43.1	24.5	68.9	16.0	31.1	19.8	80.2	37.7	89.9	4.0	88.0	74.0
Stoney Cr	SNY00023	STN302	d	ref	SWest	67	4	3/28/95	105	15	68.2	10	90.9	49.5	80.8	5.7	16.0	17.1	33.2	19.0	81.0	47.6	75.7	4.6	78.8	65.6
Stoney Cr	SNY00023	SNY366	d	ref	SWest	67	4	12/14/95	103	13	59.1	7	63.6	26.2	42.8	17.5	49.1	38.8	75.3	13.6	86.4	38.8	88.3	4.0	88.7	69.2
Stoney Cr	SNY00023	SNY780	d	ref	SWest	67	4	5/8/97	120	15	68.2	8	72.7	47.5	77.5	14.2	39.8	25.8	50.1	8.3	91.7	35.8	92.7	4.2	85.0	72.2
Stoney Cr	SNY00023	SNY1091	d	ref	SWest	67	4	10/21/97	94	18	81.8	9	81.8	41.5	67.7	7.4	20.9	27.7	53.6	4.3	95.7	36.2	92.2	4.1	86.9	72.6

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Stoney Cr	SNY00023	SNY1198	d	ref	SWest	67	4	5/14/98	91	15	68.2	9	81.8	74.7	100.0	11.0	30.8	15.4	29.8	3.3	96.7	47.3	76.2	3.6	94.5	72.3
Stoney Cr	SNY00568	SNY2901	v	ref	SWest	67	4	6/28/01	94	15	68.2	8	72.7	19.1	31.3	25.5	71.7	14.9	28.9	5.3	94.7	34.0	95.3	3.6	94.0	69.6
South Br Pot	SOA00100	SOA813	d	ref	Valley	67	2	5/21/97	109	15	68.2	12	100.0	40.4	65.9	24.8	69.5	15.6	30.2	14.7	85.3	30.3	100.0	4.0	88.7	76.0
South Br Pot	SOA00100	SOA2873	v	ref	Valley	67	2	10/13/00	118	13	59.1	8	72.7	28.0	45.7	2.5	7.1	26.3	50.9	7.6	92.4	51.7	69.8	4.6	79.3	59.6
South Br Pot	SOA00100	SOA2951	v	ref	Valley	67	2	10/15/01	177	14	63.6	8	72.7	39.0	63.6	1.1	3.2	29.9	58.0	8.5	91.5	55.9	63.7	4.6	79.5	62.0
South Br Pot	SOA00100	SOA6383	v	ref	Valley	67	2	4/25/02	112	12	54.5	7	63.6	47.3	77.2	2.7	7.5	28.6	55.4	10.7	89.3	49.1	73.5	4.6	79.2	62.6
SF Catoctin	SOC01305	SOC3044	v	ref	Northern	64	2	7/9/02	118	10	45.5	5	45.5	41.5	67.8	28.0	78.5	40.7	78.8	0.0	100.0	49.2	73.4	3.6	94.6	73.0
Strait Cr	STC00427	STC36	d	ref	Valley	67	1	10/11/94	190	23	100.0	11	100.0	35.8	58.4	13.7	38.4	32.1	62.2	3.7	96.3	34.2	95.0	3.5	95.7	80.8
Strait Cr	STC00427	STC270	d	ref	Valley	67	1	5/11/95	125	25	100.0	12	100.0	36.0	58.8	35.2	98.8	27.2	52.7	4.0	96.0	29.6	100.0	3.0	100.0	88.3
Strait Cr	STC00427	STC447	d	ref	Valley	67	1	10/26/95	108	19	86.4	10	90.9	30.6	49.9	32.4	91.0	28.7	55.6	0.9	99.1	38.0	89.6	2.9	100.0	82.8
Strait Cr	STC00427	STC574	d	ref	Valley	67	1	5/20/96	110	27	100.0	17	100.0	21.8	35.6	41.8	100.0	14.5	28.2	11.8	88.2	30.0	100.0	3.4	96.9	81.1
Strait Cr	STC00427	STC704	d	ref	Valley	67	1	10/17/96	125	16	72.7	8	72.7	56.0	91.4	4.0	11.2	15.2	29.5	5.6	94.4	52.8	68.2	3.8	91.3	66.4
Strait Cr	STC00427	STC816	d	ref	Valley	67	1	5/21/97	140	19	86.4	13	100.0	42.9	70.0	25.0	70.2	17.1	33.2	4.3	95.7	37.9	89.8	3.4	97.6	80.4
Strait Cr	STC00427	STC995	d	ref	Valley	67	1	9/30/97	159	17	77.3	9	81.8	34.0	55.4	17.0	47.7	20.1	39.0	1.3	98.7	50.3	71.8	3.9	90.2	70.2
Strait Cr	STC00427	STC1294	d	ref	Valley	67	1	10/28/98	169	19	86.4	13	100.0	32.5	53.1	28.4	79.7	15.4	29.8	2.4	97.6	37.9	89.7	3.2	99.6	79.5
Strait Cr	STC00427	STC1435	v	ref	Valley	67	1	5/17/99	121	18	81.8	11	100.0	31.4	51.3	25.6	71.9	25.6	49.7	12.4	87.6	35.5	93.1	3.8	91.3	78.3
Strait Cr	STC00427	STC2755	v	ref	Valley	67	1	10/13/99	111	21	95.5	10	90.9	24.3	39.7	20.7	58.2	53.2	100.0	1.8	98.2	42.3	83.3	3.6	93.5	82.4
Strait Cr	STC00427	STC2813	v	ref	Valley	67	1	5/4/00	127	20	90.9	12	100.0	28.3	46.3	20.5	57.5	22.8	44.3	17.3	82.7	29.1	100.0	4.2	85.5	75.9
Strait Cr	STC00427	STC2874	v	ref	Valley	67	1	10/13/00	111	19	86.4	12	100.0	53.2	86.8	11.7	32.9	45.9	89.0	3.6	96.4	39.6	87.2	3.6	93.9	84.1
Strait Cr	STC00427	STC2907	v	ref	Valley	67	1	5/3/01	125	17	77.3	11	100.0	33.6	54.8	32.8	92.1	25.6	49.6	13.6	86.4	34.4	94.8	3.3	98.9	81.7
Strait Cr	STC00427	STC2908	v	ref	Valley	67	1	5/3/01	114	20	90.9	13	100.0	27.2	44.4	30.7	86.2	19.3	37.4	21.1	78.9	36.0	92.5	3.4	96.5	78.4
Strait Cr	STC00427	STC2953	v	ref	Valley	67	1	10/15/01	141	15	68.2	9	81.8	29.1	47.5	14.2	39.8	61.7	100.0	1.4	98.6	41.1	85.0	3.8	91.5	76.6
Strait Cr	STC00427	STC2971	v	ref	Valley	67	1	4/24/02	110	19	86.4	11	100.0	34.5	56.4	29.1	81.7	12.7	24.7	10.0	90.0	36.4	91.9	3.8	90.6	77.7
Stony Cr	STY00673	STY54	d	ref	Valley	67	3	10/6/94	121	21	95.5	7	63.6	24.0	39.1	16.5	46.4	33.9	65.7	3.3	96.7	29.8	100.0	3.7	92.3	74.9
Stony Cr	STY00673	STY268	d	ref	Valley	67	3	5/9/95	134	26	100.0	13	100.0	23.9	39.0	30.6	85.9	31.3	60.7	9.7	90.3	22.4	100.0	3.8	91.1	83.4
Stony Cr	STY00673	STY444	d	ref	Valley	67	3	10/2/95	138	24	100.0	9	81.8	21.0	34.3	7.2	20.3	55.8	100.0	3.6	96.4	39.9	86.9	4.2	85.3	75.6
Stony Cr	STY00673	STY572	d	ref	Valley	67	3	5/21/96	126	21	95.5	11	100.0	41.3	67.4	12.7	35.6	22.2	43.1	30.2	69.8	45.2	79.1	4.5	81.2	71.5
Stony Cr	STY00673	STY703	d	ref	Valley	67	3	10/15/96	98	16	72.7	9	81.8	45.9	75.0	12.2	34.4	27.6	53.4	7.1	92.9	43.9	81.1	4.2	84.9	72.0
Stony Cr	STY00673	STY814	d	ref	Valley	67	3	5/27/97	119	17	77.3	9	81.8	24.4	39.8	16.0	44.8	10.9	21.2	24.4	75.6	38.7	88.6	4.7	77.8	63.4
Stony Cr	STY00673	STY997	d	ref	Valley	67	3	9/23/97	130	26	100.0	11	100.0	20.8	33.9	11.5	32.4	32.3	62.6	3.8	96.2	26.2	100.0	3.9	89.4	76.8
Summerduck Ru	SUM00388	SUM3024	v	ref	Northern	64	2	5/8/02	83	14	63.6	4	36.4	3.6	5.9	49.4	100.0	20.5	39.7	8.4	91.6	60.2	57.4	3.3	98.8	61.7
Taylors Cr	TLR01444	TLR2823	v	ref	Valley	45	1	5/10/00	106	13	59.1	4	36.4	8.5	13.9	0.0	0.0	0.0	0.0	12.3	87.7	64.2	51.8	3.9	89.8	42.3
Tye R	TYE02622	TYE579	d	ref	Valley	45	3	5/22/96	118	25	100.0	12	100.0	37.3	60.9	19.5	54.7	23.7	46.0	17.8	82.2	37.3	90.6	3.7	93.0	78.4
Tye R	TYE02622	TYE1001	d	ref	Valley	45	3	10/20/97	144	22	100.0	11	100.0	9.0	14.7	22.9	64.3	15.3	29.6	2.8	97.2	62.5	54.2	4.9	75.1	66.9
Tye R	TYE02622	TYE2962	v	ref	Valley	45	3	9/26/01	130	17	77.3	8	72.7	26.2	42.7	5.4	15.1	35.4	68.6	24.6	75.4	40.8	85.6	4.7	78.0	64.4
Tye R	TYE03271	TYE92	d	ref	Valley	66	3	10/27/94	137	25	100.0	12	100.0	21.9	35.7	45.3	100.0	38.7	75.0	2.2	97.8	36.5	91.7	3.0	100.0	87.5
Wancopin Cr	WAC00331	WAC3033	v	ref	Northern	64	2	5/14/02	110	13	59.1	6	54.5	7.3	11.9	2.7	7.7	76.4	100.0	6.4	93.6	77.3	32.8	4.2	84.8	55.6
Wallen Cr	WAL00157	WAL293	d	ref	SWest	67	4	4/19/95	94	16	72.7	8	72.7	25.5	41.7	6.4	17.9	31.9	61.9	13.8	86.2	39.4	87.6	4.3	83.2	65.5
Wallen Cr	WAL00157	WAL769	d	ref	SWest	67	4	4/15/97	95	12	54.5	6	54.5	46.3	75.6	5.3	14.8	23.2	44.9	10.5	89.5	45.3	79.1	4.5	80.4	61.7
Wallen Cr	WAL00157	WAL1093	d	ref	SWest	67	4	12/17/97	121	16	72.7	8	72.7	57.0	93.1	8.3	23.2	44.6	86.5	5.0	95.0	56.2	63.3	3.6	94.1	75.1
Wallen Cr	WAL00157	WAL1196	d	ref	SWest	67	4	6/18/98	107	19	86.4	10	90.9	40.2	65.6	7.5	21.0	22.4	43.5	20.6	79.4	38.3	89.1	4.4	82.3	69.8
Wolf Cr	WFC00020	WFC876	d	ref	WCentral	67	4	5/7/97	109	17	77.3	10	90.9	61.5	100.0	22.0	61.8	26.6	51.6	0.0	100.0	38.5	88.8	3.1	100.0	83.8
Wolf Cr	WFC00369	WFC1059	d	ref	WCentral	67	3	10/23/97	110	15	68.2	7	63.6	45.5	74.2	10.9	30.6	31.8	61.7	0.9	99.1	46.4	77.5	3.8	91.6	70.8
Wolf Cr	WFC00369	WFC1166	d	ref	WCentral	67	3	5/21/98	104	18	81.8	10	90.9	22.1	36.1	8.7	24.3	62.5	100.0	0.0	100.0	51.0	70.8	3.9	89.7	74.2
Wolf Cr	WFC00369	WFC1346	d	ref	WCentral	67	3	10/21/98	102	13	59.1	6	54.5	52.0	84.8	16.7	46.8	27.5	53.2	0.0	100.0	51.0	70.8	3.3	98.8	71.0
Wolf Cr	WFC00369	WFC1416	v	ref	WCentral	67	3	3/29/99	125	19	86.4	8	72.7	55.2	90.1	9.6	26.9	12.8	24.8	4.8	95.2	48.8	74.0	3.7	92.2	70.3
Wolf Cr	WFC01066	WFC1592	v	ref	WCentral	67	4	5/8/01	143	22	100.0	11	100.0	32.2	52.5	8.4	23.6	39.2	75.9	17.5	82.5	37.8	89.9	4.2	84.9	76.2
Wolf Cr	WFC01066	WFC1639	v	ref	WCentral	67	4	10/11/01	113	17	77.3	10	90.9	26.5	43.3	5.3	14.9	40.7	78.9	20.4	79.6	45.1	79.3	4.4	83.0	68.4
Wolf Cr	WFC03482	WLF117	d	ref	SWest	67	4	10/4/94	107	18	81.8	9	81.8	37.4	61.0	10.3	28.9	55.1	100.0	0.9	99.1	42.1	83.7	3.9	89.8	78.3

Table D-1 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Wolf Cr	WFC03482	WFC496	d	ref	SWest	67	4	5/24/96	92	17	77.3	9	81.8	19.6	31.9	21.7	61.0	42.4	82.2	10.9	89.1	44.6	80.1	4.2	84.7	73.5
Wolf Cr	WFC03482	WFC645	d	ref	SWest	67	4	10/25/96	131	18	81.8	11	100.0	31.3	51.1	9.2	25.7	61.1	100.0	2.3	97.7	48.1	75.0	3.8	91.1	77.8
Wolf Cr	WFC03482	WFC1194	d	ref	SWest	67	4	5/19/98	107	17	77.3	9	81.8	29.0	47.3	20.6	57.7	43.0	83.3	11.2	88.8	28.0	100.0	3.7	92.8	78.6
Wolf Cr	WFC04415	WFC2896	v	ref	SWest	67	4	4/26/01	106	20	90.9	12	100.0	34.0	55.4	10.4	29.1	41.5	80.4	5.7	94.3	42.5	83.1	3.8	91.4	78.1
Wolf Cr	WFC04415	WFC2911	v	ref	SWest	67	4	11/1/01	81	15	68.2	10	90.9	48.1	78.6	11.1	31.2	28.4	55.0	1.2	98.8	42.0	83.8	3.6	94.3	75.1
Wreck Island Cr	WIC00040	WIC1583	v	ref	WCentral	45	3	9/18/00	237	19	86.4	7	63.6	37.6	61.3	4.2	11.8	49.8	96.5	0.4	99.6	44.3	80.4	4.0	88.5	73.5
Whitetop Laurel	WLC01020	WLC135	d	ref	SWest	66	3	11/29/94	108	16	72.7	10	90.9	54.6	89.2	21.3	59.8	25.0	48.4	9.3	90.7	42.6	82.9	4.0	88.0	77.9
Whitetop Laurel	WLC01020	WLC1107	d	ref	SWest	66	3	12/11/97	92	17	77.3	11	100.0	42.4	69.2	34.8	97.6	15.2	29.5	9.8	90.2	38.0	89.5	2.9	100.0	81.7
Whitetop Laurel	WLC01020	WLC1207	d	ref	SWest	66	3	6/2/98	94	17	77.3	9	81.8	45.7	74.7	6.4	17.9	24.5	47.4	3.2	96.8	51.1	70.7	4.1	86.1	69.1
Wilson Cr	WLN00907	WLN2963	v	ref	Valley	67	3	10/31/01	113	19	86.4	12	100.0	50.4	82.3	27.4	77.0	35.4	68.6	7.1	92.9	40.7	85.6	3.5	95.6	86.1
Wilson Cr	WLN01035	WLN2964	v	ref	Valley	67	3	10/31/01	119	18	81.8	12	100.0	67.2	100.0	10.9	30.7	23.5	45.6	1.7	98.3	55.5	64.3	3.1	100.0	77.6
Wolf Cr	WOL00039	WOL2883	v	ref	SWest	67	4	6/26/01	107	16	72.7	7	63.6	30.8	50.3	1.9	5.2	52.3	100.0	4.7	95.3	40.2	86.4	4.2	85.0	69.8
X-trib to NF Holst	XCH00134	XCH2892	v	ref	SWest	67	1	4/16/01	13	2	9.1	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	15.4	84.6	100.0	0.0	2.6	100.0	25.3
X-trib to Falls	XDJ00015	XDJ2891	v	ref	SWest	67	2	5/30/01	92	13	59.1	8	72.7	20.7	33.7	13.0	36.6	32.6	63.2	0.0	100.0	50.0	72.2	5.1	71.9	63.7
X-trib to Falls	XDJ00015	XDJ2902	v	ref	SWest	67	2	10/30/01	94	14	63.6	7	63.6	10.6	17.4	11.7	32.8	24.5	47.4	3.2	96.8	44.7	79.9	4.9	75.0	59.6
X Trib Poor Cr	XED00002	XED2926	v	ref	Valley	67	1	10/29/01	177	15	68.2	8	72.7	61.0	99.6	2.8	7.9	80.2	100.0	2.3	97.7	79.7	29.4	4.0	88.8	70.5
UT to Great Cr	XEH00135	XEH6357	v	ref	Piedmont	45	1	4/10/01	72	18	81.8	8	72.7	6.9	11.3	41.7	100.0	25.0	48.4	5.6	94.4	36.1	92.3	4.4	82.3	72.9
X-Trib to Goose	XJI00038	XJI2983	v	ref	Northern	64	1	6/21/01	89	10	45.5	7	63.6	13.5	22.0	69.7	100.0	9.0	17.4	0.0	100.0	56.2	63.3	1.8	100.0	64.0
X-Trib to Goose	XJI00038	XJI2996	v	ref	Northern	64	1	10/23/01	125	10	45.5	7	63.6	11.2	18.3	66.4	100.0	11.2	21.7	0.0	100.0	44.0	80.9	2.3	100.0	66.2
X-Trib to Goose	XJI00038	XJI3029	v	ref	Northern	64	1	3/21/02	104	13	59.1	8	72.7	32.7	53.4	50.0	100.0	23.1	44.7	0.0	100.0	50.0	72.2	2.5	100.0	75.3

Table D-2. Site a nd sample metric and index values, Virginia DEQ 1994-2002 non-reference site data, non-coastal streams, stream orders 1-4. Index (SCI) was developed with 1994-1998 data and tested with 1999-2000 data, indicated in Data Set column by "d" and "t", respectively. Numbers of individual organisms in each sample are indicated by "N Ind." Metric acronyms are defined in Table 3-3. Samples are sorted by ascending Station ID and Sample Date. Some names are common to multiple streams.

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Abrams Cr	ABR00078	ABR39	d	other	Valley	67	1	10/17/94	106	11	50.0	4	36.4	4.7	7.7	17.9	50.3	16.0	31.1	19.8	80.2	40.6	85.8	4.9	74.4	52.0
Abrams Cr	ABR00078	ABR1299	d	other	Valley	67	1	10/9/98	156	13	59.1	3	27.3	1.3	2.1	15.4	43.2	12.2	23.6	3.8	96.2	71.2	41.7	5.1	71.3	45.6
Abrams Cr	ABR00078	ABR1414	v	other	Valley	67	1	5/10/99	113	19	86.4	6	54.5	4.4	7.2	9.7	27.3	30.1	58.3	46.9	53.1	64.6	51.1	5.7	63.6	50.2
Abrams Cr	ABR00078	ABR2714	v	other	Valley	67	1	10/20/99	108	12	54.5	4	36.4	1.9	3.0	2.8	7.8	18.5	35.9	32.4	67.6	51.9	69.5	5.1	71.3	43.3
Abrams Cr	ABR00078	ABR2764	v	other	Valley	67	1	4/12/00	110	11	50.0	4	36.4	6.4	10.4	0.9	2.6	42.7	82.8	46.4	53.6	85.5	21.0	5.1	72.0	41.1
Abrams Cr	ABR00078	ABR2825	v	other	Valley	67	1	10/17/00	112	13	59.1	6	54.5	7.1	11.7	17.9	50.1	17.9	34.6	19.6	80.4	51.8	69.6	5.1	72.6	54.1
Abrams Cr	ABR00078	ABR2909	v	other	Valley	67	1	10/10/01	142	9	40.9	4	36.4	3.5	5.7	14.8	41.5	4.9	9.6	26.8	73.2	69.7	43.7	5.4	67.2	39.8
Ash Camp Cr	ACC00260	ACC160	d	other	Piedmont	45	2	11/29/94	53	10	45.5	4	36.4	15.1	24.6	5.7	15.9	15.1	29.3	20.8	79.2	52.8	68.1	5.6	64.0	45.4
Ash Camp Cr	ACC00260	ACC330	d	other	Piedmont	45	2	6/6/95	76	8	36.4	4	36.4	23.7	38.7	3.9	11.1	17.1	33.1	52.6	47.4	69.7	43.7	5.0	73.1	40.0
Ash Camp Cr	ACC00260	ACC724	d	other	Piedmont	45	2	11/20/96	86	13	59.1	6	54.5	24.4	39.9	3.5	9.8	9.3	18.0	29.1	70.9	45.3	78.9	5.6	64.2	49.4
Ash Camp Cr	ACC00260	ACC835	d	other	Piedmont	45	2	6/2/97	65	12	54.5	5	45.5	27.7	45.2	0.0	0.0	9.2	17.9	38.5	61.5	49.2	73.3	5.7	62.6	45.1
Ash Camp Cr	ACC00260	ACC1129	d	other	Piedmont	45	2	11/14/97	58	10	45.5	4	36.4	32.8	53.5	0.0	0.0	6.9	13.4	10.3	89.7	39.7	87.2	5.5	66.1	49.0
Accotink Cr	ACO00610	ACO169	d	other	Northern	45	3	11/4/94	54	10	45.5	1	9.1	0.0	0.0	0.0	0.0	13.0	25.1	3.7	96.3	44.4	80.2	6.6	49.8	38.3
Accotink Cr	ACO00610	ACO353	d	other	Northern	45	3	5/18/95	77	13	59.1	2	18.2	1.3	2.1	0.0	0.0	6.5	12.6	19.5	80.5	32.5	97.5	7.2	40.8	38.9
Accotink Cr	ACO00610	ACO470	d	other	Northern	45	3	11/29/95	68	10	45.5	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	17.6	82.4	50.0	72.2	7.6	35.4	30.6
Accotink Cr	ACO00610	ACO599	d	other	Northern	45	3	5/30/96	68	12	54.5	2	18.2	2.9	4.8	0.0	0.0	11.8	22.8	26.5	73.5	41.2	85.0	6.8	46.5	38.2
Accotink Cr	ACO00610	ACO668	d	other	Northern	45	3	11/18/96	38	9	40.9	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	34.2	65.8	55.3	64.6	6.9	45.6	28.3
Appomattox R	APP14357	APP1411	v	other	WCentral	45	4	6/8/99	82	10	45.5	4	36.4	28.0	45.8	0.0	0.0	51.2	99.3	0.0	100.0	52.4	68.7	4.3	84.4	60.0
Appomattox R	APP14357	APP1632	v	other	WCentral	45	4	10/23/01	117	14	63.6	8	72.7	21.4	34.9	12.0	33.6	39.3	76.2	12.8	87.2	41.9	84.0	4.8	76.6	66.1
Back Cr	BAA01950	BAA400	d	other	WCentral	66	3	11/28/95	123	11	50.0	7	63.6	15.4	25.2	13.0	36.5	8.9	17.3	22.0	78.0	66.7	48.1	4.7	78.0	49.6
Back Cr	BAA01950	BAA544	d	other	WCentral	66	3	6/17/96	88	13	59.1	4	36.4	27.3	44.5	13.6	38.3	4.5	8.8	3.4	96.6	59.1	59.1	4.5	80.8	53.0
Back Cr	BAA01950	BAA1429	v	other	WCentral	66	3	3/29/99	130	12	54.5	3	27.3	1.5	2.5	0.0	0.0	2.3	4.5	14.6	85.4	73.1	38.9	5.8	61.3	34.3
Back Cr	BAR04601	BAR956	d	other	Valley	67		10/7/97	123	16	72.7	6	54.5	35.0	57.1	17.1	47.9	19.5	37.8	4.1	95.9	39.0	88.1	3.8	91.6	68.2
Back Cr	BAR04601	BAR1407	v	other	Valley	67		5/10/99	110	19	86.4	11	100.0	22.7	37.1	32.7	91.9	13.6	26.4	32.7	67.3	47.3	76.2	4.4	82.6	71.0
Back Cr	BAR04601	BAR2716	v	other	Valley	67		10/20/99	139	11	50.0	6	54.5	20.9	34.1	43.9	100.0	17.3	33.5	0.0	100.0	58.3	60.3	4.2	85.1	64.7
Back Cr	BAR04601	BAR2766	v	other	Valley	67		4/12/00	110	18	81.8	9	81.8	16.4	26.7	50.0	100.0	15.5	30.0	14.5	85.5	54.5	65.7	3.7	92.8	70.5
Back Cr	BAR04601	BAR2826	v	other	Valley	67		10/17/00	112	15	68.2	7	63.6	28.6	46.6	19.6	55.1	9.8	19.0	17.9	82.1	34.8	94.1	4.5	81.3	63.8
Back Cr	BAR04601	BAR2910	v	other	Valley	67		10/10/01	119	14	63.6	8	72.7	22.7	37.0	11.8	33.0	7.6	14.7	35.3	64.7	57.1	61.9	4.7	77.8	53.2
Back Cr	BCC02081	BCC87	d	other	Valley	67	4	10/24/94	174	18	81.8	10	90.9	48.9	79.7	12.6	35.5	46.6	90.2	1.1	98.9	45.4	78.9	3.4	97.6	81.7
Back Cr	BCC02081	BCC224	d	other	Valley	67	4	5/24/95	117	19	86.4	10	90.9	51.3	83.7	10.3	28.8	44.4	86.1	11.1	88.9	45.3	79.0	4.0	88.0	79.0
Back Cr	BCC02081	BCC955	d	other	Valley	67	4	10/6/97	132	15	68.2	6	54.5	58.3	95.2	1.5	4.3	7.6	14.7	5.3	94.7	53.8	66.8	4.0	88.1	60.8
Back Cr	BCC02081	BCC1328	d	other	Valley	67	4	10/7/98	105	14	63.6	9	81.8	73.3	100.0	6.7	18.7	70.5	100.0	2.9	97.1	70.5	42.6	3.9	90.0	74.3
Back Cr	BCC02081	BCC1391	v	other	Valley	67	4	5/13/99	104	17	77.3	9	81.8	46.2	75.3	13.5	37.8	38.5	74.5	15.4	84.6	42.3	83.3	4.0	88.2	75.4
Back Cr	BCC02081	BCC2715	v	other	Valley	67	4	10/15/99	106	10	45.5	3	27.3	59.4	97.0	0.0	0.0	66.0	100.0	0.0	100.0	59.4	58.6	3.5	96.2	65.6
Back Cr	BCC02081	BCC2767	v	other	Valley	67	4	5/2/00	109	18	81.8	8	72.7	19.3	31.4	23.9	67.0	27.5	53.3	29.4	70.6	51.4	70.2	4.3	83.7	66.4
EF Blackw	BCE00105	BCE1096	d	str	SWest	67	3	12/17/97	131	11	50.0	5	45.5	16.0	26.2	27.5	77.1	36.6	71.0	9.2	90.8	54.2	66.2	3.7	92.3	64.9
Back Cr	BCK00078	BCK402	d	other	Valley	67	2	10/19/95	91	15	68.2	6	54.5	5.5	9.0	5.5	15.4	4.4	8.5	37.4	62.6	54.9	65.1	5.7	62.5	43.2
Back Cr	BCK00078	BCK546	d	other	Valley	67	2	6/6/96	116	10	45.5	5	45.5	34.5	56.3	8.6	24.2	6.0	11.7	31.9	68.1	51.7	69.7	4.8	76.6	49.7
Back Cr	BCK00078	BCK688	d	other	Valley	67	2	11/5/96	123	15	68.2	7	63.6	16.3	26.5	13.8	38.8	7.3	14.2	17.1	82.9	43.9	81.0	5.0	73.6	56.1
Back Cr	BCK00078	BCK785	d	other	Valley	67	2	5/5/97	114	15	68.2	9	81.8	39.5	64.4	11.4	32.0	5.3	10.2	26.3	73.7	51.8	69.7	4.9	74.9	59.4
Back Cr	BCK00078	BCK954	d	other	Valley	67	2	9/18/97	109	12	54.5	2	18.2	0.0	0.0	9.2	25.8	3.7	7.1	2.8	97.2	68.8	45.1	5.9	60.1	38.5
Back Cr	BCK00078	BCK1428	v	other	Valley	67	2	5/24/99	104	8	36.4	6	54.5	52.9	86.3	0.0	0.0	26.9	52.2	39.4	60.6	66.3	48.6	4.7	78.0	52.1
Back Cr	BCK00078	BCK2827	v	other	Valley	67	2	10/19/00	134	10	45.5	7	63.6	18.7	30.5	3.7	10.5	8.2	15.9	3.0	97.0	81.3	26.9	5.4	68.3	44.8
Back Cr	BCK00947	BCK1587	v	str	WCentral	67	3	3/29/99	130	12	54.5	3	27.3	1.5	2.5	0.0	0.0	2.3	4.5	14.6	85.4	73.1	38.9	5.8	61.3	34.3
Bear Cr	BER00410	BER2887	v	other	Southwes	67	3	6/11/01	93	10	45.5	5	45.5	10.8	17.6	0.0	0.0	4.3	8.3	5.4	94.6	78.5	31.1	1.2	100.0	42.8
Buffalo Cr	BFL01679	BFL6353	v	str	SCRO	45	3	5/17/01	100	20	90.9	5	45.5	15.0	24.5	0.0	0.0	8.0	15.5	31.0	69.0	44.0	80.9	4.8	76.6	50.4
Buffalo Cr	BFL01679	BFL6354	v	str	SCRO	45	3	10/31/01	122	18	81.8	6	54.5	25.4	41.5	15.6	43.7	23.8	46.1	9.0	91.0	31.1	99.5	4.6	78.9	67.1
Buffalo Cr	BFO00200	BFO1433	v	other	WCentral	45		2/3/99	73	12	54.5	5	45.5	46.6	76.0	0.0	0.0	11.0	21.2	17.8	82.2	54.8	65.3	3.8	91.0	54.5
Big Run	BIG00180	BIG225	d	other	Valley	67	2	5/26/95	110	28	100.0	12	100.0	40.9	66.8	13.6	38.3	19.1	37.0	14.5	85.5	28.2	100.0	4.5	80.4	76.0

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Big Run	BIG00180	BIG403	d	other	Valley	67	2	10/12/95	114	14	63.6	7	63.6	21.9	35.8	47.4	100.0	21.1	40.8	4.4	95.6	58.8	59.6	3.6	93.3	69.1
Big Run	BIG00180	BIG819	d	other	Valley	67	2	5/22/97	110	18	81.8	11	100.0	37.3	60.8	29.1	81.7	17.3	33.5	20.9	79.1	36.4	91.9	4.0	88.8	77.2
Big Run	BIG00180	BIG957	d	other	Valley	67	2	10/16/97	115	21	95.5	7	63.6	14.8	24.1	20.0	56.1	20.0	38.8	7.0	93.0	40.0	86.7	4.4	81.8	67.5
Big Run	BIG00180	BIG2828	v	other	Valley	67	2	10/20/00	152	12	54.5	6	54.5	56.6	92.4	3.3	9.2	25.0	48.4	6.6	93.4	61.8	55.1	4.6	79.3	60.9
Big Run	BIG00180	BIG2912	v	other	Valley	67	2	10/23/01	111	12	54.5	7	63.6	22.5	36.8	20.7	58.2	20.7	40.2	24.3	75.7	44.1	80.7	4.5	81.6	61.4
Big Prater Cr	BIP00065	BIP509	d	other	SWest	69	4	5/21/96	95	11	50.0	4	36.4	6.3	10.3	1.1	3.0	4.2	8.2	72.6	27.4	76.8	33.5	5.6	64.3	29.1
Bull Cr	BLC00230	BLC510	d	other	SWest	69	4	5/21/96	14	2	9.1	1	9.1	0.0	0.0	0.0	0.0	14.3	27.7	0.0	100.0	100.0	0.0	5.7	63.0	26.1
Blacks Run	BLK00008	BLK2913	v	str	Valley	67		9/24/01	169	14	63.6	4	36.4	1.8	2.9	3.0	8.3	29.6	57.3	55.0	45.0	81.7	26.5	5.5	66.3	38.3
Blacks Run	BLK00562	BLK40	d	str	Valley	67	2	10/3/94	132	12	54.5	2	18.2	3.0	4.9	0.0	0.0	15.2	29.4	25.8	74.2	50.0	72.2	6.2	55.7	38.7
Blacks Run	BLK00562	BLK226	d	other	Valley	67	2	5/16/95	98	10	45.5	1	9.1	1.0	1.7	0.0	0.0	13.3	25.7	56.1	43.9	63.3	53.1	6.4	52.5	28.9
Blacks Run	BLK00562	BLK404	d	other	Valley	67	2	9/27/95	99	12	54.5	1	9.1	0.0	0.0	0.0	0.0	17.2	33.3	50.5	49.5	66.7	48.1	5.7	63.1	32.2
Blacks Run	BLK00562	BLK547	d	other	Valley	67	2	5/23/96	113	10	45.5	0	0.0	0.0	0.0	0.0	0.0	14.2	27.4	35.4	64.6	54.9	65.2	6.3	53.7	32.1
Blacks Run	BLK00562	BLK689	d	str	Valley	67	2	10/3/96	105	12	54.5	0	0.0	0.0	0.0	0.0	0.0	4.8	9.2	49.5	50.5	63.8	52.3	6.2	55.3	27.7
Blacks Run	BLK00562	BLK788	d	other	Valley	67	2	4/30/97	118	9	40.9	0	0.0	0.0	0.0	0.0	0.0	2.5	4.9	82.2	17.8	83.9	23.3	6.1	57.9	18.1
Blacks Run	BLK00562	BLK960	d	other	Valley	67	2	9/17/97	129	10	45.5	2	18.2	2.3	3.8	0.0	0.0	11.6	22.5	32.6	67.4	75.2	35.8	6.5	50.8	30.5
Blacks Run	BLK00562	BLK1403	v	str	Valley	67	2	5/26/99	240	9	40.9	2	18.2	0.4	0.7	0.0	0.0	2.1	4.0	83.8	16.3	90.8	13.2	6.2	56.5	18.7
Blacks Run	BLK00562	BLK2768	v	str	Valley	67	2	5/17/00	290	12	54.5	2	18.2	0.3	0.6	0.0	0.0	3.4	6.7	65.9	34.1	82.8	24.9	6.5	51.4	23.8
Blacks Run	BLK00562	BLK2830	v	str	Valley	67	2	10/24/00	136	15	68.2	2	18.2	0.0	0.0	2.2	6.2	7.4	14.2	36.8	63.2	73.5	38.2	6.8	46.8	31.9
Blacks Run	BLK00562	BLK2914	v	str	Valley	67	2	9/24/01	117	11	50.0	2	18.2	3.4	5.6	0.0	0.0	23.1	44.7	23.9	76.1	65.0	50.6	5.9	60.4	38.2
NF Blackwater	BNR00040	BNR23	d	str	WCentral	45	2	10/25/94	104	9	40.9	3	27.3	3.8	6.3	0.0	0.0	23.1	44.7	19.2	80.8	67.3	47.2	5.8	61.3	38.6
NF Blackwater	BNR00040	BNR220	d	other	WCentral	45	2	5/18/95	91	11	50.0	6	54.5	25.3	41.3	3.3	9.3	19.8	38.3	34.1	65.9	58.2	60.3	5.0	74.0	49.2
NF Blackwater	BNR00040	BNR399	d	str	WCentral	45	2	11/16/95	118	9	40.9	4	36.4	2.5	4.2	0.8	2.4	5.1	9.9	61.9	38.1	79.7	29.4	5.6	64.3	28.2
NF Blackwater	BNR00040	BNR531	d	str	WCentral	45	2	5/21/96	100	5	22.7	2	18.2	7.0	11.4	0.0	0.0	0.0	0.0	90.0	10.0	95.0	7.2	5.8	61.9	16.4
NF Blackwater	BNR00040	BNR757	d	str	WCentral	45	2	1/21/97	106	6	27.3	1	9.1	0.0	0.0	0.0	0.0	5.7	11.0	20.8	79.2	80.2	28.6	5.9	59.6	26.9
NF Blackwater	BNR00040	BNR874	d	str	WCentral	45	2	5/23/97	100	7	31.8	4	36.4	11.0	18.0	0.0	0.0	3.0	5.8	20.0	80.0	84.0	23.1	5.7	62.9	32.3
NF Blackwater	BNR00040	BNR1047	d	other	WCentral	45	2	10/20/97	101	7	31.8	3	27.3	4.0	6.5	0.0	0.0	16.8	32.6	9.9	90.1	73.3	38.6	5.5	66.8	36.7
NF Blackwater	BNR00040	BNR1164	d	other	WCentral	45	2	5/6/98	104	11	50.0	6	54.5	79.8	100.0	1.0	2.7	9.6	18.6	5.8	94.2	77.9	31.9	4.2	85.6	54.7
NF Blackwater	BNR00040	BNR1357	d	str	WCentral	45	2	10/26/98	101	7	31.8	1	9.1	0.0	0.0	0.0	0.0	53.5	100.0	9.9	90.1	82.2	25.7	4.8	76.5	41.7
NF Blackwater	BNR00040	BNR1420	v	str	WCentral	45	2	4/14/99	117	7	31.8	3	27.3	59.0	96.3	0.0	0.0	12.0	23.2	21.4	78.6	73.5	38.3	4.8	77.0	46.6
NF Blackwater	BNR00040	BNR1468	v	str	WCentral	45	2	10/25/99	105	11	50.0	3	27.3	4.8	7.8	0.0	0.0	7.6	14.8	61.0	39.0	75.2	35.8	6.4	52.2	28.4
NF Blackwater	BNR00040	BNR1497	v	str	WCentral	45	2	4/5/00	98	11	50.0	5	45.5	72.4	100.0	0.0	0.0	2.0	4.0	12.2	87.8	78.6	31.0	4.6	79.6	49.7
NF Blackwater	BNR00040	BNR1535	v	str	WCentral	45	2	7/13/00	148	9	40.9	2	18.2	0.7	1.1	0.0	0.0	3.4	6.5	38.5	61.5	68.2	45.9	6.6	49.6	28.0
NF Blackwater	BNR00040	BNR1574	v	str	WCentral	45	2	10/2/00	131	12	54.5	6	54.5	6.1	10.0	0.8	2.1	14.5	28.1	5.3	94.7	58.0	60.6	5.2	70.6	46.9
NF Blackwater	BNR00040	BNR1626	v	str	WCentral	45	2	3/27/01	160	11	50.0	4	36.4	37.5	61.2	0.0	0.0	3.1	6.1	23.8	76.3	63.1	53.3	6.2	56.0	42.4
NF Blackwater I	BNR00153	BNR1536	v	other	WCentral	45	2	7/26/00	130	21	95.5	6	54.5	4.6	7.5	4.6	13.0	29.2	56.6	19.2	80.8	45.4	78.9	4.9	75.1	57.7
NF Blackwater I	BNR00153	BNR1625	v	other	WCentral	45	2	3/27/01	130	11	50.0	5	45.5	39.2	64.0	2.3	6.5	7.7	14.9	27.7	72.3	58.5	60.0	5.4	68.2	47.7
NF Blackwater I	BNR00321	BNR1537	v	other	WCentral	45	2	7/13/00	120	13	59.1	6	54.5	15.8	25.8	0.8	2.3	55.8	100.0	0.0	100.0	59.2	59.0	4.8	76.7	59.7
NF Blackwater I	BNR00321	BNR1624	v	other	WCentral	45	2	3/27/01	163	14	63.6	6	54.5	58.3	95.1	1.2	3.4	7.4	14.3	15.3	84.7	66.9	47.9	4.5	81.3	55.6
Beaver Cr	BRC00188	BRC919	d	other	Northern	45	2	4/21/97	155	17	77.3	7	63.6	66.5	100.0	10.3	29.0	31.0	60.0	0.6	99.4	51.0	70.8	3.6	94.0	74.3
Beaver Cr	BRC00188	BRC949	d	other	Northern	45	2	10/27/97	203	18	81.8	7	63.6	52.7	86.0	16.3	45.6	24.1	46.8	2.5	97.5	41.9	84.0	3.8	91.4	74.6
Beaver Cr	BRC00188	BRC1231	d	other	Northern	45	2	7/23/98	135	19	86.4	6	54.5	49.6	81.0	3.0	8.3	37.8	73.2	4.4	95.6	49.6	72.8	4.4	82.8	69.3
Beaver Cr	BRC00188	BRC1272	d	other	Northern	45	2	12/15/98	149	19	86.4	7	63.6	63.1	100.0	14.1	39.6	33.6	65.0	2.0	98.0	52.3	68.8	3.6	94.1	76.9
Beaver Cr	BRC00188	BRC1400	v	other	Northern	64	2	4/29/99	159	20	90.9	7	63.6	51.6	84.2	15.1	42.4	17.0	32.9	1.3	98.7	45.3	79.0	3.9	89.4	72.7
Beaver Cr	BRC00188	BRC1436	v	other	Northern	64	2	10/18/99	174	16	72.7	6	54.5	30.5	49.7	40.2	100.0	21.8	42.3	4.0	96.0	55.2	64.8	3.5	95.9	72.0
Beaver Cr	BRC00188	BRC2780	v	other	Northern	64	2	3/28/00	151	16	72.7	7	63.6	60.9	99.5	0.0	0.0	45.7	88.6	1.3	98.7	56.3	63.1	3.5	95.2	72.7
Beaver Cr	BRC00188	BRC2809	v	other	Northern	64	2	12/4/00	107	14	63.6	6	54.5	41.1	67.1	23.4	65.6	26.2	50.7	0.0	100.0	38.3	89.1	3.5	96.0	73.3
Beaver Cr	BRC00188	BRC3040	v	other	Northern	64	2	6/3/02	102	15	68.2	8	72.7	36.3	59.2	37.3	100.0	21.6	41.8	0.0	100.0	39.2	87.8	3.3	98.5	78.5
Brook Run	BRK00197	BRK3031	v	other	Northern	64	3	5/9/02	80	8	36.4	0	0.0	0.0	0.0	0.0	0.0	30.0	58.1	42.5	57.5	65.0	50.6	7.8	32.9	29.4
Brattons Run	BRT00003	BRT50	d	other	Valley	67	2	11/3/94	89	11	50.0	4	36.4	44.9	73.4	12.4	34.7	29.2	56.6	9.0	91.0	44.9	79.5	4.0	88.7	63.8

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Brattons Run	BRT00094	BRT49	d	other	Valley	67	2	11/3/94	151	16	72.7	6	54.5	67.5	100.0	14.6	40.9	20.5	39.8	2.0	98.0	66.9	47.8	3.0	100.0	69.2
Brattons Run	BRT00094	BRT227	d	other	Valley	67	2	5/10/95	101	22	100.0	9	81.8	18.8	30.7	14.9	41.7	8.9	17.3	44.6	55.4	52.5	68.6	4.6	80.0	59.5
Brattons Run	BRT00094	BRT405	d	other	Valley	67	2	11/2/95	124	17	77.3	6	54.5	26.6	43.4	14.5	40.7	45.2	87.5	4.0	96.0	37.1	90.9	3.8	90.4	72.6
Brattons Run	BRT00094	BRT958	d	other	Valley	67	2	10/2/97	117	16	72.7	7	63.6	17.9	29.3	17.1	48.0	49.6	96.1	1.7	98.3	51.3	70.4	3.7	93.1	71.4
Brattons Run	BRT00094	BRT1411	v	other	Valley	67	2	5/6/99	107	20	90.9	7	63.6	20.6	33.6	21.5	60.3	33.6	65.2	14.0	86.0	29.9	100.0	3.9	89.7	73.7
Brattons Run	BRT00094	BRT2832	v	other	Valley	67	2	10/30/00	99	12	54.5	4	36.4	58.6	95.6	11.1	31.2	36.4	70.5	5.1	94.9	57.6	61.3	3.1	100.0	68.1
Broad Axe Cr	BRX00066	BRX789	d	other	Valley	64	1	5/7/97	101	14	63.6	10	90.9	53.5	87.3	23.8	66.7	2.0	3.8	14.9	85.1	63.4	52.9	3.9	89.5	67.5
Broad Axe Cr	BRX00066	BRX961	d	other	Valley	64	1	9/29/97	105	17	77.3	6	54.5	10.5	17.1	7.6	21.4	9.5	18.5	7.6	92.4	53.3	67.4	4.6	79.4	53.5
Broad Axe Cr	BRX00066	BRX1304	d	other	Valley	64	1	10/13/98	107	8	36.4	4	36.4	4.7	7.6	2.8	7.9	6.5	12.7	16.8	83.2	87.9	17.5	5.7	62.9	33.1
Broad Axe Cr	BRX00066	BRX1432	v	other	Valley	64	1	5/12/99	125	12	54.5	8	72.7	13.6	22.2	8.8	24.7	3.2	6.2	69.6	30.4	82.4	25.4	5.3	69.4	38.2
Broad Axe Cr	BRX00066	BRX2717	v	other	Valley	64	1	10/25/99	97	18	81.8	7	63.6	6.2	10.1	0.0	0.0	12.4	24.0	29.9	70.1	47.4	75.9	4.7	77.7	50.4
Broad Axe Cr	BRX00066	BRX2770	v	other	Valley	64	1	4/20/00	154	10	45.5	3	27.3	31.2	50.9	0.0	0.0	3.2	6.3	29.9	70.1	63.0	53.5	5.9	60.5	39.3
Broad Axe Cr	BRX00066	BRX2916	v	other	Valley	64	1	9/26/01	109	12	54.5	4	36.4	0.0	0.0	4.6	12.9	4.6	8.9	8.3	91.7	75.2	35.8	5.5	66.5	38.3
SF Blackwater I	BSF00234	BSF1540	v	other	WCentral	45	2	7/11/00	246	21	95.5	9	81.8	26.4	43.1	10.6	29.7	39.4	76.4	6.9	93.1	37.4	90.4	4.7	78.1	73.5
SF Blackwater I	BSF00234	BSF1623	v	other	WCentral	45	2	3/27/01	137	15	68.2	5	45.5	48.9	79.8	0.0	0.0	8.0	15.6	23.4	76.6	70.8	42.2	4.7	77.7	50.7
Bluestone R	BST02305	BLU774	d	other	SWest	69	3	6/25/97	96	7	31.8	1	9.1	0.0	0.0	0.0	0.0	26.0	50.5	55.2	44.8	80.2	28.6	5.5	66.6	28.9
Bottom Cr	BTM01000	BTM1525	v	other	WCentral	66		9/21/00	127	23	100.0	12	100.0	47.2	77.1	26.8	75.1	21.3	41.2	0.0	100.0	29.9	100.0	3.5	96.2	86.2
Bottom Cr	BTM01102	BTM1579	v	other	WCentral	66	1	9/21/00	127	23	100.0	12	100.0	47.2	77.1	26.8	75.1	21.3	41.2	0.0	100.0	29.9	100.0	3.5	96.2	86.2
Buffalo R	BUF00218	BUF91	d	other	Valley	45	4	10/27/94	104	17	77.3	9	81.8	27.9	45.5	18.3	51.3	25.0	48.4	7.7	92.3	35.6	93.1	4.2	84.8	71.8
Buffalo R	BUF00218	BUF6377	v	other	Valley	45	4	5/29/02	208	16	72.7	11	100.0	51.0	83.2	6.7	18.9	14.9	28.9	19.2	80.8	45.2	79.2	4.2	84.6	68.5
Beaver Cr	BVR00084	BVR2886	v	str	Valley	67	2	5/17/01	153	19	86.4	9	81.8	43.1	70.4	5.9	16.5	13.1	25.3	26.8	73.2	49.7	72.7	4.8	76.1	62.8
Beaver Cr	BVR00084	BVR2898	v	str	Valley	67	2	10/4/01	399	16	72.7	7	63.6	29.8	48.7	8.0	22.5	16.5	32.1	30.1	69.9	51.1	70.6	4.8	76.9	57.1
Beaver Cr	BVR00275	BVR786	d	other	Valley	67	1	5/8/97	135	17	77.3	8	72.7	51.9	84.6	5.9	16.6	5.9	11.5	14.1	85.9	46.7	77.0	4.6	79.4	63.1
Beaver Cr	BVR00275	BVR962	d	other	Valley	67	1	10/1/97	108	17	77.3	6	54.5	15.7	25.7	3.7	10.4	15.7	30.5	14.8	85.2	57.4	61.5	5.7	63.7	51.1
Beaver Cr	BVR00275	BVR1290	d	str	Valley	67	1	10/14/98	167	13	59.1	5	45.5	9.0	14.7	0.0	0.0	7.2	13.9	34.7	65.3	79.0	30.3	5.6	64.3	36.6
Beaver Cr	BVR00275	BVR1399	v	other	Valley	67	1	5/26/99	125	14	63.6	8	72.7	28.0	45.7	4.8	13.5	6.4	12.4	35.2	64.8	55.2	64.7	5.2	70.4	51.0
Beaver Cr	BVR00275	BVR2771	v	other	Valley	67	1	4/24/00	106	15	68.2	6	54.5	23.6	38.5	4.7	13.2	34.0	65.8	10.4	89.6	40.6	85.8	4.8	76.5	61.5
Beaver Cr	BVR00275	BVR2917	v	other	Valley	67	1	9/24/01	353	19	86.4	8	72.7	20.1	32.8	5.4	15.1	13.3	25.8	18.7	81.3	58.1	60.6	5.3	68.6	55.4
Beaver Cr	BVR00360	BVR787	d	other	Valley	67	2	5/8/97	102	17	77.3	9	81.8	42.2	68.8	16.7	46.8	21.6	41.8	11.8	88.2	35.3	93.5	4.1	86.2	73.1
Blackwater R	BWR04580	BWR21	d	other	WCentral	45	3	10/25/94	115	10	45.5	6	54.5	64.3	100.0	3.5	9.8	7.8	15.2	0.9	99.1	73.9	37.7	3.3	98.0	57.5
Blackwater R	BWR04580	BWR201	d	other	WCentral	45	3	5/18/95	104	14	63.6	7	63.6	28.8	47.1	11.5	32.4	17.3	33.5	3.8	96.2	48.1	75.0	4.2	85.8	62.2
Blackwater R	BWR04580	BWR397	d	other	WCentral	45	3	11/16/95	109	13	59.1	5	45.5	12.8	21.0	29.4	82.4	13.8	26.7	5.5	94.5	50.5	71.6	3.8	90.9	61.4
Blackwater R	BWR04580	BWR538	d	other	WCentral	45	3	5/21/96	89	16	72.7	8	72.7	36.0	58.7	10.1	28.4	37.1	71.9	5.6	94.4	32.6	97.4	4.4	81.6	72.2
Blackwater R	BWR04580	BWR756	d	other	WCentral	45	3	1/21/97	94	8	36.4	4	36.4	12.8	20.8	21.3	59.7	26.6	51.5	2.1	97.9	50.0	72.2	4.4	83.0	57.2
Blackwater R	BWR04580	BWR868	d	other	WCentral	45	3	5/23/97	88	8	36.4	4	36.4	46.6	76.1	12.5	35.1	1.1	2.2	13.6	86.4	51.1	70.6	3.8	91.0	54.3
Blackwater R	BWR04580	BWR1045	d	other	WCentral	45	3	10/20/97	111	11	50.0	4	36.4	2.7	4.4	10.8	30.3	16.2	31.4	0.9	99.1	63.1	53.4	5.1	72.4	47.2
Blackwater R	BWR04580	BWR1167	d	other	WCentral	45	3	5/6/98	85	13	59.1	5	45.5	55.3	90.3	1.2	3.3	28.2	54.7	1.2	98.8	54.1	66.3	4.0	87.5	63.2
Blackwater R	BWR04580	BWR1422	v	other	WCentral	45	3	4/13/99	120	15	68.2	6	54.5	43.3	70.7	0.0	0.0	10.8	21.0	16.7	83.3	43.3	81.9	4.7	77.4	57.1
Blackwater R	BWR04580	BWR1470	v	other	WCentral	45	3	10/25/99	98	18	81.8	9	81.8	39.8	65.0	23.5	65.9	26.5	51.4	6.1	93.9	36.7	91.4	3.7	92.5	78.0
Blackwater R	BWR04580	BWR1499	v	other	WCentral	45	3	4/5/00	95	17	77.3	6	54.5	51.6	84.2	6.3	17.7	20.0	38.8	7.4	92.6	55.8	63.9	3.8	91.1	65.0
Blackwater R	BWR04580	BWR1538	v	other	WCentral	45	3	7/11/00	261	21	95.5	8	72.7	10.3	16.9	12.6	35.5	23.8	46.0	12.6	87.4	42.9	82.5	4.7	78.1	64.3
Blackwater R	BWR04580	BWR1572	v	other	WCentral	45	3	9/28/00	156	19	86.4	8	72.7	20.5	33.5	5.1	14.4	32.7	63.4	10.9	89.1	28.8	100.0	4.6	78.9	67.3
Blackwater R	BWR04580	BWR1627	v	other	WCentral	45	3	3/26/01	128	13	59.1	7	63.6	23.4	38.3	0.0	0.0	10.2	19.7	51.6	48.4	68.0	46.3	5.3	68.7	43.0
Blackwater R	BWR04973	BWR1539	v	other	WCentral	45	3	8/8/00	245	16	72.7	8	72.7	28.6	46.6	1.2	3.4	37.1	72.0	4.9	95.1	41.2	84.9	4.5	80.7	66.0
Blackwater R	BWR06120	BWR20	d	other	WCentral	45	3	10/25/94	127	13	59.1	6	54.5	33.9	55.3	1.6	4.4	31.5	61.0	5.5	94.5	54.3	66.0	4.6	79.4	59.3
Blackwater R	BWR06120	BWR200	d	other	WCentral	45	3	5/18/95	106	11	50.0	6	54.5	11.3	18.5	4.7	13.2	24.5	47.5	13.2	86.8	53.8	66.8	5.3	69.6	50.9
Blackwater R	BWR06120	BWR396	d	other	WCentral	45	3	11/16/95	105	14	63.6	7	63.6	27.6	45.1	5.7	16.0	22.9	44.3	5.7	94.3	55.2	64.7	4.3	84.4	59.5
Blackwater R	BWR06120	BWR532	d	other	WCentral	45	3	5/21/96	100	11	50.0	4	36.4	14.0	22.9	0.0	0.0	17.0	32.9	36.0	64.0	56.0	63.6	6.4	53.3	40.4
Blackwater R	BWR06120	BWR865	d	other	WCentral	45	3	5/23/97	111	13	59.1	6	54.5	27.9	45.6	3.6	10.1	7.2	14.0	31.5	68.5	50.5	71.6	5.1	71.4	49.3

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Blackwater R	BWR06120	BWR1046	d	other	WCentral	45	3	10/20/97	101	12	54.5	4	36.4	3.0	4.8	0.0	0.0	8.9	17.3	5.0	95.0	79.2	30.0	5.7	63.9	37.8
Blackwater R	BWR06120	BWR1158	d	other	WCentral	45	3	5/6/98	166	11	50.0	5	45.5	45.2	73.8	0.0	0.0	38.0	73.6	3.0	97.0	78.3	31.3	3.1	100.0	58.9
Blackwater R	BWR06120	BWR1358	d	other	WCentral	45	3	10/26/98	136	8	36.4	2	18.2	2.2	3.6	0.0	0.0	20.6	39.9	3.7	96.3	83.8	23.4	5.5	66.8	35.6
Blackwater R	BWR06120	BWR1421	v	other	WCentral	45	3	4/14/99	116	12	54.5	4	36.4	61.2	99.9	0.0	0.0	15.5	30.1	9.5	90.5	64.7	51.1	4.5	80.3	55.4
Blackwater R	BWR06120	BWR1469	v	other	WCentral	45	3	10/25/99	102	12	54.5	6	54.5	47.1	76.8	0.0	0.0	26.5	51.3	5.9	94.1	45.1	79.3	4.1	86.0	62.1
Blackwater R	BWR06120	BWR1498	v	other	WCentral	45	3	4/5/00	113	15	68.2	6	54.5	43.4	70.8	0.0	0.0	14.2	27.4	10.6	89.4	40.7	85.6	4.1	86.6	60.3
Blackwater R	BWR06120	BWR1573	v	other	WCentral	45	3	10/5/00	235	17	77.3	5	45.5	28.1	45.8	0.4	1.2	26.8	52.0	5.1	94.9	43.4	81.7	4.7	77.5	59.5
Byers Cr	BYS00008	BYS2155	v	other	Southwes	67	4	3/8/01	122	13	59.1	7	63.6	41.0	66.9	11.5	32.2	21.3	41.3	9.0	91.0	49.2	73.4	4.5	80.9	63.6
Captain Hickory	CAH00182	CAH2987	v	other	Northern	64	2	5/29/01	46	12	54.5	3	27.3	6.5	10.6	8.7	24.4	6.5	12.6	0.0	100.0	37.0	91.1	4.5	80.5	50.1
Captain Hickory	CAH00182	CAH3008	v	other	Northern	64	2	10/29/01	88	6	27.3	4	36.4	13.6	22.3	2.3	6.4	12.5	24.2	0.0	100.0	90.9	13.1	5.6	65.3	36.9
Crab Cr	CBC00100	CBC31	d	other	WCentral	67	2	10/6/94	120	11	50.0	5	45.5	26.7	43.5	0.8	2.3	11.7	22.6	0.0	100.0	64.2	51.8	4.9	75.3	48.9
Crab Cr	CBC00100	CBC211	d	other	WCentral	67	2	4/20/95	153	6	27.3	1	9.1	0.0	0.0	0.0	0.0	1.3	2.5	50.3	49.7	96.7	4.7	6.0	59.0	19.0
Crab Cr	CBC00100	CBC383	d	other	WCentral	67	2	10/19/95	118	9	40.9	2	18.2	10.2	16.6	0.0	0.0	5.1	9.9	0.8	99.2	80.5	28.2	5.5	65.8	34.8
Crab Cr	CBC00100	CBC516	d	other	WCentral	67	2	4/30/96	102	7	31.8	1	9.1	0.0	0.0	0.0	0.0	5.9	11.4	73.5	26.5	77.5	32.6	6.2	55.6	20.9
Crab Cr	CBC00100	CBC740	d	other	WCentral	67	2	9/26/96	97	7	31.8	2	18.2	4.1	6.7	0.0	0.0	13.4	26.0	12.4	87.6	62.9	53.6	5.6	64.1	36.0
Crab Cr	CBC00100	CBC1042	d	other	WCentral	67	2	10/6/97	92	9	40.9	3	27.3	15.2	24.8	0.0	0.0	7.6	14.7	6.5	93.5	75.0	36.1	5.5	66.6	38.0
Crab Cr	CBC00100	CBC1183	d	other	WCentral	67	2	4/28/98	100	3	13.6	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	89.0	11.0	95.0	7.2	6.1	57.3	12.3
Crab Cr	CBC00100	CBC1423	v	other	WCentral	67	2	3/11/99	195	7	31.8	3	27.3	3.1	5.0	0.0	0.0	0.5	1.0	80.0	20.0	88.7	16.3	8.6	20.6	15.2
Crab Cr	CBC00100	CBC1460	v	other	WCentral	67	2	10/26/99	125	11	50.0	5	45.5	16.8	27.4	0.0	0.0	4.8	9.3	8.0	92.0	60.0	57.8	5.0	73.6	44.5
Crab Cr	CBC00100	CBC1517	v	other	WCentral	67	2	5/1/00	147	13	59.1	8	72.7	12.9	21.1	12.2	34.4	17.7	34.3	49.0	51.0	68.0	46.2	5.6	64.5	47.9
Crab Cr	CBC00100	CBC1546	v	other	WCentral	67	2	10/13/00	261	14	63.6	7	63.6	55.2	90.1	0.0	0.0	9.6	18.6	5.4	94.6	62.1	54.8	4.5	81.0	58.3
Crab Cr	CBC00438	CBC30	d	other	WCentral	67	2	10/6/94	106	8	36.4	4	36.4	11.3	18.5	0.0	0.0	11.3	21.9	8.5	91.5	72.6	39.5	5.4	67.0	38.9
Crab Cr	CBC00438	CBC210	d	str	WCentral	67	2	4/20/95	118	5	22.7	1	9.1	0.0	0.0	0.0	0.0	1.7	3.3	30.5	69.5	94.9	7.3	5.9	59.7	21.5
Crab Cr	CBC00438	CBC385	d	other	WCentral	67	2	10/19/95	113	7	31.8	2	18.2	4.4	7.2	0.0	0.0	8.0	15.4	8.0	92.0	75.2	35.8	5.6	65.0	33.2
Crab Cr	CBC00438	CBC518	d	other	WCentral	67	2	4/30/96	100	8	36.4	2	18.2	1.0	1.6	0.0	0.0	3.0	5.8	85.0	15.0	91.0	13.0	5.9	60.0	18.7
Crab Cr	CBC00438	CBC741	d	other	WCentral	67	2	9/26/96	121	5	22.7	1	9.1	0.0	0.0	0.0	0.0	6.6	12.8	5.8	94.2	86.0	20.3	5.8	61.8	27.6
Crab Cr	CBC00438	CBC1041	d	other	WCentral	67	2	10/6/97	116	9	40.9	2	18.2	10.3	16.9	0.0	0.0	6.0	11.7	6.9	93.1	71.6	41.1	5.7	63.0	35.6
Crab Cr	CBC00438	CBC1348	d	str	WCentral	67	2	10/21/98	110	5	22.7	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	9.1	90.9	92.7	10.5	5.9	60.1	24.2
Crab Cr	CBC00438	CBC1424	v	other	WCentral	67	2	3/11/99	114	9	40.9	4	36.4	28.1	45.8	0.0	0.0	18.4	35.7	30.7	69.3	54.4	65.9	4.9	75.0	46.1
Crab Cr	CBC00438	CBC1461	v	other	WCentral	67	2	10/26/99	106	7	31.8	3	27.3	12.3	20.0	0.0	0.0	2.8	5.5	9.4	90.6	78.3	31.3	5.5	66.1	34.1
Crab Cr	CBC00438	CBC1518	v	other	WCentral	67	2	5/1/00	124	10	45.5	5	45.5	18.5	30.3	0.0	0.0	8.1	15.6	29.0	71.0	63.7	52.4	5.3	69.0	41.2
Crab Cr	CBC00438	CBC1547	v	other	WCentral	67	2	10/13/00	226	13	59.1	5	45.5	35.8	58.5	0.0	0.0	8.4	16.3	4.4	95.6	64.6	51.1	5.1	72.7	49.8
Crab Cr	CBC00635	CBC29	d	other	WCentral	67	2	10/6/94	110	10	45.5	5	45.5	21.8	35.6	1.8	5.1	7.3	14.1	0.9	99.1	74.5	36.8	5.3	69.5	43.9
Crab Cr	CBC00635	CBC209	d	other	WCentral	67	2	4/20/95	150	13	59.1	7	63.6	15.3	25.0	2.0	5.6	1.3	2.6	7.3	92.7	74.0	37.6	5.5	66.5	44.1
Crab Cr	CBC00635	CBC384	d	other	WCentral	67	2	10/19/95	111	9	40.9	4	36.4	24.3	39.7	1.8	5.1	37.8	73.3	2.7	97.3	61.3	56.0	4.7	78.1	53.3
Crab Cr	CBC00635	CBC517	d	other	WCentral	67	2	4/30/96	108	9	40.9	4	36.4	12.0	19.6	1.9	5.2	18.5	35.9	41.7	58.3	58.3	60.2	5.2	70.6	40.9
Crab Cr	CBC00635	CBC742	d	other	WCentral	67	2	9/26/96	90	5	22.7	2	18.2	10.0	16.3	0.0	0.0	40.0	77.5	0.0	100.0	71.1	41.7	4.9	75.4	44.0
Crab Cr	CBC00635	CBC1043	d	other	WCentral	67	2	10/6/97	96	9	40.9	2	18.2	4.2	6.8	0.0	0.0	13.5	26.2	2.1	97.9	79.2	30.1	5.7	63.2	35.4
Crab Cr	CBC00635	CBC1181	d	other	WCentral	67	2	4/28/98	103	9	40.9	3	27.3	7.8	12.7	0.0	0.0	10.7	20.7	31.1	68.9	69.9	43.5	5.4	66.9	35.1
Crab Cr	CBC00635	CBC1350	d	other	WCentral	67	2	10/21/98	114	10	45.5	5	45.5	7.0	11.5	0.9	2.5	14.0	27.2	5.3	94.7	79.8	29.1	5.6	65.2	40.1
Crab Cr	CBC00635	CBC1425	v	other	WCentral	67	2	3/11/99	147	13	59.1	6	54.5	27.9	45.5	0.0	0.0	8.2	15.8	25.2	74.8	53.7	66.8	5.0	73.3	48.7
Crab Cr	CBC00635	CBC1462	v	other	WCentral	67	2	10/26/99	141	10	45.5	6	54.5	39.7	64.8	7.8	21.9	20.6	39.9	2.1	97.9	52.5	68.6	4.4	82.1	59.4
Crab Cr	CBC00635	CBC1519	v	other	WCentral	67	2	5/1/00	109	10	45.5	6	54.5	39.4	64.4	0.0	0.0	12.8	24.9	10.1	89.9	55.0	64.9	4.9	75.0	52.4
Crab Cr	CBC00635	CBC1548	v	other	WCentral	67	2	10/13/00	231	14	63.6	6	54.5	28.6	46.6	0.9	2.4	8.7	16.8	3.0	97.0	79.7	29.4	5.2	70.4	47.6
Cedar Cr	CDR01355	CDR57	d	other	Valley	67	3	10/13/94	156	22	100.0	9	81.8	30.8	50.2	25.0	70.2	35.9	69.6	1.3	98.7	30.8	100.0	3.7	92.7	82.9
Cedar Cr	CDR01355	CDR409	d	other	Valley	67	3	10/16/95	121	17	77.3	8	72.7	29.8	48.6	16.5	46.4	47.1	91.3	4.1	95.9	38.0	89.5	3.6	93.5	76.9
Cedar Cr	CDR01355	CDR2918	v	other	Valley	67	3	9/27/01	174	14	63.6	9	81.8	15.5	25.3	9.8	27.4	41.4	80.2	34.5	65.5	57.5	61.4	4.7	77.9	60.4
Cedar Cr	CDR01549	CDR963	d	other	Valley	67	3	10/7/97	148	19	86.4	9	81.8	18.2	29.8	33.8	94.8	39.2	75.9	1.4	98.6	50.0	72.2	3.7	92.4	79.0
Cedar Cr	CED00004	CED2893	v	other	Southwes	67	4	3/9/01	98	13	59.1	8	72.7	44.9	73.3	17.3	48.7	22.4	43.5	8.2	91.8	48.0	75.2	4.3	84.3	68.6

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Cedar Run	CER01646	CER911	d	other	Northern	64	2	3/28/97	148	20	90.9	5	45.5	31.1	50.7	0.0	0.0	31.1	60.2	2.7	97.3	39.2	87.8	4.9	74.4	63.4
Cedar Run	CER01646	CER945	d	other	Northern	64	2	10/1/97	175	19	86.4	5	45.5	26.3	42.9	9.1	25.7	23.4	45.4	1.7	98.3	36.0	92.4	4.9	74.6	63.9
Cedar Run	CER01646	CER1218	d	other	Northern	64	2	4/27/98	144	17	77.3	10	90.9	28.5	46.5	20.1	56.5	37.5	72.7	2.8	97.2	28.5	100.0	3.8	90.6	79.0
Cedar Run	CER01646	CER1268	d	other	Northern	64	2	10/6/98	116	19	86.4	7	63.6	37.9	61.9	5.2	14.5	41.4	80.2	0.9	99.1	46.6	77.2	4.6	79.2	70.3
Cedar Run	CER01646	CER1411	v	other	Northern	64	2	4/7/99	117	22	100.0	6	54.5	32.5	53.0	6.8	19.2	47.0	91.1	1.7	98.3	40.2	86.4	4.5	81.3	73.0
Cedar Run	CER01646	CER0164(	v	other	Northern	64	2	9/23/99	120	17	77.3	3	27.3	12.5	20.4	0.0	0.0	47.5	92.1	0.8	99.2	40.8	85.5	5.1	72.1	59.2
Cedar Run	CER01646	CER2773	v	other	Northern	64	2	3/7/00	100	15	68.2	4	36.4	35.0	57.1	4.0	11.2	34.0	65.9	4.0	96.0	43.0	82.3	4.8	76.1	61.7
Cedar Run	CER01646	CER2791	v	other	Northern	64	2	11/29/00	172	16	72.7	6	54.5	47.7	77.8	2.3	6.5	30.8	59.7	1.7	98.3	48.8	73.9	4.6	80.0	65.4
Calfpasture Riv	CFP00254	CFP89	d	other	Valley	67	4	10/12/94	122	19	86.4	8	72.7	42.6	69.6	30.3	85.1	24.6	47.7	1.6	98.4	39.3	87.6	3.0	100.0	80.9
Calfpasture Riv	CFP00254	CFP230	d	other	Valley	67	4	5/25/95	102	19	86.4	10	90.9	48.0	78.4	8.8	24.8	27.5	53.2	19.6	80.4	37.3	90.6	4.2	85.0	73.7
Calfpasture Riv	CFP00254	CFP408	d	other	Valley	67	4	10/17/95	110	20	90.9	8	72.7	33.6	54.9	26.4	74.0	26.4	51.1	1.8	98.2	35.5	93.2	3.6	93.8	78.6
Cooks Cr	CKS00304	CKS93	d	str	Valley	67	3	9/26/94	202	13	59.1	2	18.2	5.0	8.1	0.0	0.0	2.0	3.8	9.9	90.1	64.4	51.5	7.4	38.8	33.7
Cooks Cr	CKS00304	CKS232	d	str	Valley	67	3	5/16/95	181	9	40.9	1	9.1	1.1	1.8	0.0	0.0	1.7	3.2	8.8	91.2	78.5	31.1	8.0	29.8	25.9
Cooks Cr	CKS00304	CKS411	d	other	Valley	67	3	9/27/95	112	14	63.6	2	18.2	4.5	7.3	0.0	0.0	5.4	10.4	23.2	76.8	58.9	59.3	6.9	46.2	35.2
Cooks Cr	CKS00304	CKS550	d	other	Valley	67	3	6/3/96	121	10	45.5	1	9.1	0.8	1.3	0.0	0.0	10.7	20.8	22.3	77.7	44.6	80.0	6.8	46.8	35.1
Cooks Cr	CKS00304	CKS690	d	str	Valley	67	3	10/3/96	100	9	40.9	2	18.2	6.0	9.8	0.0	0.0	0.0	0.0	30.0	70.0	80.0	28.9	6.1	57.8	28.2
Cooks Cr	CKS00304	CKS791	d	str	Valley	67	3	5/22/97	128	9	40.9	2	18.2	5.5	8.9	0.0	0.0	0.0	0.0	45.3	54.7	85.9	20.3	6.0	58.3	25.2
Cooks Cr	CKS00304	CKS964	d	str	Valley	67	3	9/17/97	111	15	68.2	3	27.3	3.6	5.9	2.7	7.6	29.7	57.6	16.2	83.8	55.9	63.8	6.2	55.6	46.2
Cooks Cr	CKS00304	CKS1285	d	str	Valley	67	3	10/6/98	128	17	77.3	4	36.4	1.6	2.6	0.8	2.2	34.4	66.6	46.9	53.1	78.1	31.6	5.5	66.2	42.0
Cooks Cr	CKS00304	CKS1388	v	str	Valley	67	3	5/26/99	339	9	40.9	3	27.3	0.3	0.5	0.6	1.7	27.4	53.2	64.9	35.1	91.7	11.9	5.6	64.9	29.4
Cooks Cr	CKS00304	CKS2773	v	str	Valley	67	3	5/17/00	269	13	59.1	1	9.1	0.0	0.0	4.8	13.6	30.5	59.1	18.2	81.8	43.5	81.6	7.4	38.1	42.8
Cooks Cr	CKS00304	CKS2834	v	str	Valley	67	3	10/24/00	227	12	54.5	2	18.2	0.0	0.0	1.3	3.7	3.1	6.0	33.5	66.5	65.6	49.6	6.7	47.8	30.8
Cooks Cr	CKS00304	CKS2920	v	str	Valley	67	3	9/24/01	179	11	50.0	2	18.2	0.0	0.0	9.5	26.7	18.4	35.7	44.7	55.3	67.6	46.8	6.5	51.6	35.5
Clinch R	CLN34680	CLN296	d	other	SWest	67	4	5/9/95	95	13	59.1	6	54.5	29.5	48.1	3.2	8.9	43.2	83.6	24.2	75.8	41.1	85.1	4.6	79.8	61.9
Clinch R	CLN34680	CLN770	d	other	SWest	67	4	6/25/97	94	11	50.0	5	45.5	13.8	22.6	2.1	6.0	43.6	84.5	17.0	83.0	54.3	66.1	5.2	70.7	53.5
Chapel Run	CPL00283	CPL2883	v	other	Valley	67	2	5/24/01	104	10	45.5	3	27.3	25.0	40.8	0.0	0.0	26.0	50.3	10.6	89.4	57.7	61.1	6.1	56.7	46.4
Chapel Run	CPL00283	CPL2894	v	other	Valley	67	2	10/16/01	109	9	40.9	4	36.4	17.4	28.5	23.9	67.0	11.0	21.3	12.8	87.2	49.5	72.9	5.3	68.4	52.8
Chestnut Cr	CST00264	CST291	d	other	SWest	66	3	4/10/95	116	9	40.9	5	45.5	29.3	47.8	10.3	29.0	32.8	63.5	13.8	86.2	39.7	87.2	4.5	80.3	60.1
Chestnut Cr	CST00264	CST766	d	other	SWest	66	3	6/10/97	106	8	36.4	4	36.4	37.7	61.6	1.9	5.3	13.2	25.6	9.4	90.6	62.3	54.5	4.8	75.7	48.3
Christians Cr	CST00742	CST58	d	other	Valley	67	3	10/20/94	114	19	86.4	10	90.9	29.8	48.7	14.9	41.9	22.8	44.2	4.4	95.6	28.9	100.0	4.6	79.5	73.4
Christians Cr	CST00742	CST231	d	other	Valley	67	3	5/1/95	123	20	90.9	9	81.8	34.1	55.7	8.1	22.8	18.7	36.2	14.6	85.4	31.7	98.6	4.6	78.7	68.8
Christians Cr	CST00742	CST410	d	other	Valley	67	3	10/11/95	110	16	72.7	8	72.7	26.4	43.0	14.5	40.8	40.9	79.3	3.6	96.4	42.7	82.7	4.3	83.6	71.4
Christians Cr	CST00742	CST1314	d	other	Valley	67	3	10/6/98	109	13	59.1	6	54.5	11.0	18.0	7.3	20.6	55.0	100.0	6.4	93.6	54.1	66.3	4.4	81.8	61.7
Christians Cr	CST00742	CST1390	v	other	Valley	67	3	5/24/99	159	17	77.3	7	63.6	28.3	46.2	0.0	0.0	47.8	92.6	19.5	80.5	44.7	79.9	4.5	81.1	65.2
Christians Cr	CST00742	CST2719	v	other	Valley	67	3	10/26/99	148	17	77.3	7	63.6	15.5	25.4	21.6	60.7	35.1	68.1	0.7	99.3	46.6	77.1	4.1	86.4	69.7
Christians Cr	CST00742	CST2774	v	other	Valley	67	3	4/11/00	327	19	86.4	10	90.9	23.5	38.4	5.2	14.6	25.1	48.6	33.9	66.1	55.0	64.9	5.0	72.8	60.3
Christians Cr	CST00742	CST2921	v	other	Valley	67	3	10/16/01	108	14	63.6	5	45.5	33.3	54.4	0.0	0.0	38.9	75.4	8.3	91.7	41.7	84.3	4.7	78.0	61.6
Christians Cr	CST00742	CST2968	v	other	Valley	67	3	5/28/02	238	18	81.8	7	63.6	28.2	46.0	2.9	8.3	40.3	78.2	27.3	72.7	51.7	69.8	4.8	75.7	62.0
Chestnut Cr	CST01018	CST354	d	other	SWest	66	3	1/3/96	103	13	59.1	9	81.8	10.7	17.4	15.5	43.6	34.0	65.9	10.7	89.3	47.6	75.7	4.1	86.0	64.9
Chestnut Cr	CST01329	CST290	d	other	SWest	67	3	4/10/95	105	14	63.6	7	63.6	47.6	77.7	1.0	2.7	26.7	51.7	11.4	88.6	47.6	75.7	4.2	84.7	63.5
Chestnut Cr	CST01329	CST765	d	other	SWest	67	3	6/10/97	104	10	45.5	5	45.5	47.1	76.9	1.0	2.7	16.3	31.7	17.3	82.7	45.2	79.2	4.7	77.3	55.2
Cub Run	CUB00040	CUB820	d	other	Valley	67	2	5/6/97	114	20	90.9	12	100.0	32.5	53.0	26.3	73.9	12.3	23.8	18.4	81.6	31.6	98.8	4.1	86.1	76.0
Cub Run	CUB00040	CUB965	d	other	Valley	67	2	9/25/97	106	15	68.2	8	72.7	17.9	29.3	29.2	82.1	33.0	64.0	2.8	97.2	38.7	88.6	3.8	91.4	74.2
Cub Run	CUB00040	CUB2721	v	other	Valley	67	2	10/19/99	115	15	68.2	12	100.0	10.4	17.0	24.3	68.3	63.5	100.0	0.9	99.1	65.2	50.2	3.5	95.6	74.8
Cub Run	CUB00040	CUB2775	v	other	Valley	67	2	5/11/00	114	17	77.3	12	100.0	15.8	25.8	22.8	64.0	33.3	64.6	28.9	71.1	55.3	64.6	4.1	86.2	69.2
Cub Run	CUB00040	CUB2922	v	other	Valley	67	2	10/23/01	104	20	90.9	14	100.0	26.0	42.4	35.6	99.9	29.8	57.8	17.3	82.7	32.7	97.2	3.5	95.0	83.2
Cub Run	CUB00040	CUB6391	v	other	Valley	67	2	5/22/02	211	22	100.0	14	100.0	30.8	50.3	28.9	81.2	18.5	35.8	24.2	75.8	39.8	86.9	3.8	90.7	77.6
Cub Run	CUB00040	CUB6392	v	other	Valley	67	2	5/22/02	147	20	90.9	10	90.9	18.4	30.0	21.1	59.2	11.6	22.4	41.5	58.5	57.1	61.9	4.7	78.1	61.5
Cove Cr	CVR00117	COV113	d	other	SWest	67	3	10/24/94	101	13	59.1	7	63.6	10.9	17.8	18.8	52.8	34.7	67.2	12.9	87.1	41.6	84.4	4.3	83.8	64.5

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Cove Cr	CVR00257	CVR1095	d	other	SWest	67	3	12/16/97	114	14	63.6	7	63.6	17.5	28.6	6.1	17.2	42.1	81.6	10.5	89.5	55.3	64.6	4.4	81.7	61.3
Cove Cr	CVR00257	CVR1202	d	other	SWest	67	3	4/28/98	101	15	68.2	7	63.6	33.7	55.0	5.0	13.9	35.6	69.1	18.8	81.2	43.6	81.5	4.4	82.5	64.4
Cowpasture R	CWP00243	CWP1503	v	other	WCentral	67		4/1/00	92	18	81.8	8	72.7	30.4	49.7	25.0	70.2	39.1	75.8	6.5	93.5	29.3	100.0	3.7	92.0	79.5
Cowpasture R	CWP02328	CWP2884	v	other	Valley	67		5/15/01	144	21	95.5	11	100.0	34.0	55.5	18.8	52.6	40.3	78.1	20.1	79.9	42.4	83.3	4.4	83.0	78.5
Cowpasture R	CWP02328	CWP2892	v	other	Valley	67		10/22/01	153	16	72.7	8	72.7	26.1	42.7	24.2	67.9	37.3	72.2	3.9	96.1	38.6	88.7	4.3	84.0	74.6
Difficult Run	DIF00086	DIF179	d	other	Northern	64	3	9/14/94	83	11	50.0	3	27.3	16.9	27.5	0.0	0.0	37.3	72.4	6.0	94.0	45.8	78.3	4.4	81.8	53.9
Difficult Run	DIF00086	DIF343	d	other	Northern	64	3	5/3/95	101	17	77.3	5	45.5	47.5	77.6	4.0	11.1	26.7	51.8	4.0	96.0	39.6	87.2	4.5	81.3	66.0
Difficult Run	DIF00086	DIF468	d	other	Northern	64	3	10/26/95	110	14	63.6	4	36.4	27.3	44.5	3.6	10.2	26.4	51.1	2.7	97.3	36.4	91.9	4.3	84.0	59.9
Difficult Run	DIF00086	DIF581	d	other	Northern	64	3	5/22/96	48	10	45.5	1	9.1	8.3	13.6	0.0	0.0	29.2	56.5	16.7	83.3	56.3	63.2	5.3	69.8	42.6
Difficult Run	DIF00086	DIF664	d	other	Northern	64	3	11/5/96	70	13	59.1	4	36.4	27.1	44.3	5.7	16.0	12.9	24.9	5.7	94.3	44.3	80.5	4.7	77.7	54.2
Difficult Run	DIF00086	DIF916	d	other	Northern	64	3	4/15/97	116	16	72.7	6	54.5	27.6	45.0	2.6	7.3	34.5	66.8	1.7	98.3	39.7	87.2	4.4	82.2	64.3
Difficult Run	DIF00086	DIF941	d	other	Northern	64	3	9/5/97	124	14	63.6	4	36.4	18.5	30.3	7.3	20.4	31.5	61.0	2.4	97.6	37.9	89.7	4.6	79.5	59.8
Difficult Run	DIF00086	DIF1215	d	other	Northern	64	3	6/27/98	147	14	63.6	3	27.3	1.4	2.2	3.4	9.5	12.9	25.0	6.1	93.9	65.3	50.1	5.5	66.0	42.2
Difficult Run	DIF00086	DIF1264	d	other	Northern	64	3	10/6/98	107	16	72.7	5	45.5	26.2	42.7	15.0	42.0	20.6	39.8	3.7	96.3	35.5	93.1	4.3	83.1	64.4
Difficult Run	DIF00086	DIF1402	v	other	Northern	64	3	5/20/99	126	15	68.2	3	27.3	3.2	5.2	5.6	15.6	26.2	50.8	9.5	90.5	40.5	86.0	4.9	74.3	52.2
Difficult Run	DIF00086	DIF2767	v	other	Northern	64	3	6/7/00	107	13	59.1	2	18.2	3.7	6.1	0.0	0.0	18.7	36.2	4.7	95.3	47.7	75.6	5.6	64.5	44.4
Difficult Run	DIF00086	DIF2793	v	other	Northern	64	3	11/6/00	66	10	45.5	2	18.2	27.3	44.5	0.0	0.0	27.3	52.9	6.1	93.9	62.1	54.7	5.1	72.6	47.8
Difficult Run	DIF01057	DIF3039	v	other	Northern	64	3	5/20/02	99	7	31.8	1	9.1	0.0	0.0	0.0	0.0	5.1	9.8	0.0	100.0	84.8	21.9	5.7	63.1	29.5
DollinsCr	DLN00142	DLN792	d	other	Valley	64	1	5/7/97	138	16	72.7	9	81.8	31.2	50.9	5.8	16.3	8.7	16.9	13.0	87.0	62.3	54.4	4.9	75.6	56.9
Dry Run	DRI00021	DRI2885	v	other	Valley	67	3	5/17/01	232	7	31.8	5	45.5	10.3	16.9	0.4	1.2	1.3	2.5	88.8	11.2	95.7	6.2	5.8	62.3	22.2
Dry Run	DRI00021	DRI2897	v	other	Valley	67	3	10/9/01	114	10	45.5	4	36.4	53.5	87.3	0.0	0.0	51.8	100.0	39.5	60.5	89.5	15.2	4.9	74.4	52.4
Dumps Cr	DUM00023	DUM2889	v	str	SWest	69	4	4/25/01	45	7	31.8	3	27.3	13.3	21.8	0.0	0.0	15.6	30.1	8.9	91.1	53.3	67.4	4.6	79.0	43.6
Dumps Cr	DUM00023	DUM2906	v	str	SWest	69	4	10/18/01	107	6	27.3	3	27.3	7.5	12.2	0.0	0.0	6.5	12.7	0.9	99.1	91.6	12.1	5.7	62.8	31.7
Dumps Cr	DUM00109	DUM299	d	other	SWest	69	4	5/8/95	104	14	63.6	6	54.5	23.1	37.7	1.9	5.4	29.8	57.8	33.7	66.3	53.8	66.7	5.0	73.5	53.2
Dumps Cr	DUM00109	DUM361	d	other	SWest	69	4	12/6/95	97	10	45.5	4	36.4	26.8	43.8	10.3	28.9	36.1	69.9	15.5	84.5	35.1	93.8	4.2	84.5	60.9
Dumps Cr	DUM00109	DUM1103	d	str	SWest	69	4	10/8/97	93	9	40.9	1	9.1	0.0	0.0	0.0	0.0	36.6	70.9	9.7	90.3	72.0	40.4	5.1	71.6	40.4
Dry R	DUR00011	DUR59	d	other	Valley	67	4	10/20/94	124	18	81.8	7	63.6	48.4	79.0	12.9	36.2	24.2	46.9	4.8	95.2	37.9	89.7	3.9	90.3	72.8
Dry R	DUR00011	DUR234	d	other	Valley	67	4	5/30/95	111	17	77.3	9	81.8	44.1	72.1	9.9	27.8	25.2	48.9	7.2	92.8	27.0	100.0	4.2	84.6	73.2
Dry R	DUR00011	DUR413	d	other	Valley	67	4	9/28/95	121	17	77.3	8	72.7	28.9	47.2	7.4	20.9	30.6	59.3	5.0	95.0	39.7	87.1	4.8	76.0	67.0
Dry R	DUR00011	DUR2722	v	other	Valley	67	4	10/28/99	113	12	54.5	7	63.6	16.8	27.4	4.4	12.4	5.3	10.3	42.5	57.5	72.6	39.6	5.4	67.8	41.7
Dry R	DUR00011	DUR2777	v	other	Valley	67	4	4/24/00	127	16	72.7	8	72.7	19.7	32.1	1.6	4.4	7.9	15.3	26.0	74.0	63.0	53.5	5.6	65.1	48.7
Dry R	DUR00011	DUR2836	v	other	Valley	67	4	10/24/00	118	10	45.5	5	45.5	44.9	73.3	11.0	30.9	41.5	80.5	2.5	97.5	66.1	49.0	4.7	78.5	62.6
Dry R	DUR00011	DUR2923	v	other	Valley	67	4	9/24/01	203	14	63.6	5	45.5	36.5	59.5	13.3	37.3	44.8	86.9	8.9	91.1	55.2	64.8	5.0	73.1	65.2
Dry Fork	DYF00190	DYF2898	v	other	SWest	69	3	6/5/01	94	8	36.4	1	9.1	0.0	0.0	0.0	0.0	26.6	51.5	42.6	57.4	68.1	46.1	5.5	66.6	33.4
Dry Fork	DYF00190	DYF2899	v	other	SWest	69	3	6/5/01	98	7	31.8	3	27.3	2.0	3.3	0.0	0.0	28.6	55.4	29.6	70.4	58.2	60.4	5.3	68.4	39.6
East Hawksbill (	EHC00118	EHC42	d	other	Valley	67	2	10/18/94	184	16	72.7	5	45.5	12.5	20.4	0.0	0.0	26.6	51.6	6.0	94.0	71.2	41.6	5.2	70.3	49.5
East Hawksbill (	EHC00118	EHC2924	v	other	Valley	67	2	10/23/01	490	16	72.7	8	72.7	3.3	5.3	0.8	2.3	0.6	1.2	9.2	90.8	88.6	16.5	5.8	61.4	40.4
East Hawksbill (	EHC00118	EHC2925	v	other	Valley	67	2	10/23/01	341	18	81.8	8	72.7	5.0	8.1	0.9	2.5	1.5	2.8	10.9	89.1	83.6	23.7	5.8	61.9	42.9
Elkhorn Cr	EKH00318	EKH1609	v	other	WCentral	45	3	5/15/01	99	16	72.7	9	81.8	19.2	31.3	12.1	34.0	5.1	9.8	48.5	51.5	57.6	61.3	4.9	74.5	52.1
Elkhorn Cr	EKH00318	EKH1610	v	other	WCentral	45	3	5/15/01	93	14	63.6	9	81.8	18.3	29.8	6.5	18.1	5.4	10.4	57.0	43.0	66.7	48.1	5.2	70.0	45.6
Elkhorn Cr	EKH00318	EKH1634	v	other	WCentral	45	3	10/30/01	120	16	72.7	9	81.8	42.5	69.4	6.7	18.7	22.5	43.6	20.8	79.2	43.3	81.9	4.3	84.0	66.4
Flat Cr	FCA00140	FCA1431	v	other	WCentral	45	3	6/7/99	100	14	63.6	5	45.5	61.0	99.6	0.0	0.0	8.0	15.5	2.0	98.0	61.0	56.3	3.8	91.0	58.7
Flat Cr	FCA00140	FCA1513	v	other	WCentral	45	3	5/15/00	110	11	50.0	6	54.5	20.0	32.6	10.0	28.1	4.5	8.8	6.4	93.6	69.1	44.6	4.8	76.5	48.6
Flatlick Br	FLL00062	FLL2988	v	other	Northern	64	2	5/30/01	95	11	50.0	2	18.2	1.1	1.7	0.0	0.0	22.1	42.8	7.4	92.6	58.9	59.3	5.7	63.0	41.0
Flatlick Br	FLL00062	FLL3016	v	other	Northern	64	2	10/22/01	45	10	45.5	2	18.2	2.2	3.6	0.0	0.0	48.9	94.7	6.7	93.3	75.6	35.3	5.5	66.3	44.6
Flat Run	FLT00270	FLT927	d	other	Northern	45	2	6/19/97	41	13	59.1	3	27.3	19.5	31.9	0.0	0.0	19.5	37.8	2.4	97.6	39.0	88.1	5.2	69.9	51.5
Flat Cr	FLT00879	FLT151	d	other	Piedmont	45	1	11/15/94	100	1	4.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	9.0	14.7	2.4
Flat Cr	FLT00879	FLT320	d	other	Piedmont	45	1	5/8/95	100	1	4.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0	0.0	9.0	14.7	2.4
Flat Cr	FLT00879	FLT730	d	other	Piedmont	45	1	10/24/96	94	8	36.4	0	0.0	0.0	0.0	0.0	0.0	10.6	20.6	29.8	70.2	45.7	78.4	6.0	58.8	33.0

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Flat Cr	FLT00879	FLT839	d	other	Piedmont	45	1	5/23/97	66	6	27.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.4	57.6	60.6	56.9	7.6	34.7	22.1
Flat Cr	FLT00879	FLT1121	d	other	Piedmont	45	1	11/11/97	93	11	50.0	0	0.0	0.0	0.0	0.0	0.0	5.4	10.4	26.9	73.1	32.3	97.8	6.9	45.7	34.6
Flat Cr	FLT00879	FLT1242	d	other	Piedmont	45	1	5/13/98	66	9	40.9	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.5	54.5	47.0	76.6	7.0	43.4	26.9
Flat Cr	FLT00917	FLT150	d	other	Piedmont	45	1	11/15/94	46	4	18.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.3	45.7	76.1	34.5	5.4	67.4	20.7
Flat Cr	FLT00917	FLT319	d	other	Piedmont	45	1	5/8/95	64	13	59.1	3	27.3	6.3	10.2	0.0	0.0	3.1	6.1	43.8	56.3	53.1	67.7	5.5	65.4	36.5
Flat Cr	FLT00917	FLT729	d	other	Piedmont	45	1	10/24/96	90	13	59.1	3	27.3	7.8	12.7	0.0	0.0	11.1	21.5	36.7	63.3	36.7	91.5	6.5	51.4	40.9
Flat Cr	FLT00917	FLT838	d	other	Piedmont	45	1	5/23/97	40	9	40.9	2	18.2	10.0	16.3	0.0	0.0	0.0	0.0	25.0	75.0	45.0	79.4	5.0	74.2	38.0
Flat Cr	FLT00917	FLT1120	d	other	Piedmont	45	1	11/11/97	68	11	50.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.3	64.7	54.4	65.8	6.8	46.9	28.4
Flat Cr	FLT00917	FLT1241	d	other	Piedmont	45	1	5/13/98	39	8	36.4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.6	74.4	43.6	81.5	4.4	82.9	34.4
Fryingpan Cr	FRY00225	FRY505	d	other	SWest	69	4	6/19/96	94	13	59.1	4	36.4	29.8	48.6	1.1	3.0	8.5	16.5	12.8	87.2	42.6	83.0	4.7	78.3	51.5
Fox Cr	FXC00330	FOX1209	d	other	SWest	66	4	6/2/98	109	15	68.2	7	63.6	31.2	50.9	5.5	15.5	51.4	99.6	9.2	90.8	40.4	86.1	3.9	89.1	70.5
Garden Cr	GAR00016	GAR508	d	other	SWest	69	4	4/11/96	60	5	22.7	1	9.1	0.0	0.0	0.0	0.0	10.0	19.4	18.3	81.7	85.0	21.7	7.1	42.1	24.6
Garden Cr	GAR00016	GAR1104	d	str	SWest	69	4	11/12/97	106	6	27.3	1	9.1	0.0	0.0	0.0	0.0	3.8	7.3	7.5	92.5	91.5	12.3	5.9	60.7	26.1
Gills Cr	GIL00921	GIL1532	v	other	WCentral	45	2	8/14/00	123	13	59.1	6	54.5	27.6	45.1	1.6	4.6	10.6	20.5	22.0	78.0	54.5	65.8	5.0	73.5	50.1
Gills Cr	GIL00921	GIL1533	v	other	WCentral	45	2	8/14/00	209	16	72.7	8	72.7	15.3	25.0	2.4	6.7	20.6	39.9	21.1	78.9	49.3	73.3	5.4	67.6	54.6
Great Run	GRT00170	GRT166	d	other	Northern	64	2	9/23/94	109	18	81.8	6	54.5	27.5	44.9	12.8	36.1	11.0	21.3	2.8	97.2	45.0	79.5	4.4	81.7	62.1
Great Run	GRT00170	GRT348	d	other	Northern	64	2	5/19/95	101	13	59.1	4	36.4	43.6	71.1	0.0	0.0	9.9	19.2	5.0	95.0	45.5	78.7	4.4	82.2	55.2
Great Run	GRT00170	GRT462	d	other	Northern	64	2	9/21/95	127	14	63.6	4	36.4	48.0	78.4	0.0	0.0	26.8	51.9	4.7	95.3	41.7	84.2	4.5	80.4	61.3
Great Run	GRT00170	GRT585	d	other	Northern	64	2	5/14/96	123	13	59.1	5	45.5	40.7	66.4	1.6	4.6	21.1	41.0	2.4	97.6	51.2	70.5	4.3	83.3	58.5
Great Run	GRT00170	GRT654	d	other	Northern	64	2	10/21/96	124	16	72.7	6	54.5	41.9	68.5	8.1	22.6	12.9	25.0	2.4	97.6	46.8	76.9	4.4	82.7	62.6
Great Run	GRT00170	GRT905	d	other	Northern	64	2	3/10/97	124	19	86.4	6	54.5	45.2	73.7	0.8	2.3	12.9	25.0	1.6	98.4	41.1	85.0	4.5	80.9	63.3
Great Run	GRT00170	GRT937	d	other	Northern	64	2	9/17/97	170	19	86.4	4	36.4	45.3	73.9	0.0	0.0	27.6	53.6	5.3	94.7	47.1	76.5	3.9	89.0	63.8
Great Run	GRT00170	GRT1222	d	other	Northern	64	2	3/16/98	168	18	81.8	8	72.7	48.2	78.7	3.0	8.4	20.2	39.2	1.8	98.2	42.3	83.4	4.3	84.0	68.3
Great Run	GRT00170	GRT1270	d	other	Northern	64	2	10/27/98	107	18	81.8	5	45.5	47.7	77.8	5.6	15.7	49.5	96.0	2.8	97.2	52.3	68.8	4.5	81.0	70.5
Great Run	GRT00170	GRT1409	v	other	Northern	64	2	3/30/99	151	18	81.8	5	45.5	39.7	64.9	7.9	22.3	31.8	61.6	2.6	97.4	39.7	87.0	4.6	79.9	67.6
Great Run	GRT00170	GRT1429	v	other	Northern	64	2	9/22/99	167	17	77.3	5	45.5	37.1	60.6	0.0	0.0	14.4	27.9	1.2	98.8	50.9	70.9	4.4	81.6	57.8
Great Run	GRT00170	GRT2776	v	other	Northern	64	2	3/14/00	179	16	72.7	3	27.3	50.8	83.0	0.0	0.0	15.6	30.3	3.4	96.6	54.7	65.4	4.1	86.7	57.8
Great Run	GRT00170	GRT2798	v	other	Northern	64	2	9/12/00	172	17	77.3	3	27.3	30.8	50.3	0.0	0.0	13.4	25.9	2.9	97.1	37.8	89.9	4.7	77.8	55.7
Harris Cr	HAZ00680	HAZ1591	v	other	WCentral	45	3	5/10/01	102	13	59.1	9	81.8	72.5	100.0	4.9	13.8	8.8	17.1	9.8	90.2	54.9	65.1	4.1	87.3	64.3
Hazel R	HAZ03254	HAZ334	d	other	Northern	64	2	4/17/95	113	16	72.7	7	63.6	39.8	65.0	11.5	32.3	27.4	53.2	0.9	99.1	33.6	95.9	3.5	95.8	72.2
Hazel R	HAZ03254	HAZ460	d	other	Northern	64	2	9/27/95	105	13	59.1	5	45.5	38.1	62.2	15.2	42.8	11.4	22.1	1.0	99.0	40.0	86.7	3.9	89.2	63.3
Hazel R	HAZ03254	HAZ584	d	other	Northern	64	2	4/12/96	104	13	59.1	5	45.5	45.2	73.8	17.3	48.6	19.2	37.3	1.0	99.0	35.6	93.1	3.5	95.7	69.0
Hazel R	HAZ03254	HAZ651	d	other	Northern	64	2	10/17/96	112	19	86.4	6	54.5	33.0	53.9	7.1	20.1	22.3	43.3	2.7	97.3	29.5	100.0	4.3	83.2	67.3
Hazel R	HAZ03254	HAZ908	d	other	Northern	64	2	4/2/97	114	15	68.2	6	54.5	43.9	71.6	7.9	22.2	15.8	30.6	4.4	95.6	42.1	83.6	4.4	82.6	63.6
Hazel R	HAZ03254	HAZ931	d	other	Northern	64	2	10/7/97	167	21	95.5	7	63.6	31.7	51.8	22.2	62.2	14.4	27.9	3.6	96.4	30.5	100.0	4.0	87.9	73.2
Hazel R	HAZ03254	HAZ1223	d	other	Northern	64	2	3/30/98	101	18	81.8	7	63.6	45.5	74.3	10.9	30.6	21.8	42.2	4.0	96.0	34.7	94.4	4.1	86.7	71.2
Hazel R	HAZ03254	HAZ1277	d	other	Northern	64	2	10/28/98	137	17	77.3	7	63.6	51.1	83.4	10.2	28.7	21.2	41.0	2.2	97.8	48.9	73.8	3.9	89.6	69.4
Hazel R	HAZ03254	HAZ1413	v	other	Northern	64	2	4/8/99	142	22	100.0	9	81.8	37.3	60.9	13.4	37.6	14.1	27.3	5.6	94.4	23.9	100.0	4.1	87.1	73.6
Hazel R	HAZ03254	HAZ1431	v	other	Northern	64	2	9/28/99	113	16	72.7	6	54.5	46.9	76.6	8.8	24.8	10.6	20.6	0.9	99.1	49.6	72.9	3.9	90.3	63.9
Hazel R	HAZ03254	HAZ2777	v	other	Northern	64	2	3/8/00	140	18	81.8	8	72.7	51.4	83.9	13.6	38.1	12.1	23.5	7.9	92.1	46.4	77.4	4.1	87.4	69.6
Hazel R	HAZ03254	HAZ2796	v	other	Northern	64	2	11/8/00	153	13	59.1	7	63.6	47.7	77.9	6.5	18.3	11.1	21.5	0.0	100.0	56.9	62.3	3.8	91.1	61.8
Hazel R	HAZ03254	HAZ2978	v	other	Northern	64	2	5/1/01	100	13	59.1	8	72.7	62.0	100.0	5.0	14.0	20.0	38.8	0.0	100.0	59.0	59.2	4.3	84.3	66.0
Hazel R	HAZ03254	HAZ3000	v	other	Northern	64	2	9/20/01	98	10	45.5	7	63.6	30.6	50.0	27.6	77.3	16.3	31.6	0.0	100.0	39.8	87.0	3.9	89.4	68.1
Hazel R	HAZ03254	HAZ3019	v	other	Northern	64	2	4/2/02	114	9	40.9	7	63.6	45.6	74.5	26.3	73.9	8.8	17.0	0.0	100.0	51.8	69.7	3.7	92.3	66.5
Hunting Camp (	HCC00140	HUN116	d	other	SWest	67	3	10/4/94	111	12	54.5	4	36.4	18.0	29.4	27.9	78.4	9.9	19.2	3.6	96.4	64.9	50.8	4.3	84.3	56.2
Hunting Camp (	HCC00140	HCC495	d	other	SWest	67	3	5/24/96	118	11	50.0	5	45.5	15.3	24.9	10.2	28.5	0.0	0.0	10.2	89.8	55.9	63.7	5.6	65.0	45.9
Hunting Camp (	HCC00140	HCC646	d	other	SWest	67	3	10/25/96	94	13	59.1	8	72.7	10.6	17.4	22.3	62.7	7.4	14.4	7.4	92.6	51.1	70.7	4.5	80.5	58.8
Hunting Camp (	HCC00140	HCC1188	d	other	SWest	67	3	5/19/98	136	15	68.2	7	63.6	42.6	69.6	10.3	28.9	12.5	24.2	25.0	75.0	48.5	74.3	4.0	88.6	61.6
Horsepen Cr	HEN00474	HEN6362	v	str	SCRO	45	3	5/16/01	110	18	81.8	4	36.4	11.8	19.3	14.5	40.8	9.1	17.6	28.2	71.8	31.8	98.5	5.2	71.1	54.7

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Horsepen Cr	HEN00474	HEN6363	v	str	SCRO	45	3	10/18/01	101	11	50.0	4	36.4	22.8	37.2	0.0	0.0	16.8	32.6	45.5	54.5	62.4	54.3	4.7	78.3	42.9
Hawksbill Cr	HKL00223	HKL551	d	other	Valley	66	2	4/22/96	112	22	100.0	11	100.0	35.7	58.3	22.3	62.7	18.8	36.3	13.4	86.6	34.8	94.1	3.5	95.3	79.2
Hawksbill Cr	HKS00096	HKS60	d	other	Valley	67	3	10/18/94	178	21	95.5	7	63.6	39.9	65.1	9.6	26.8	44.9	87.1	4.5	95.5	37.6	90.1	4.0	88.7	76.6
Hawksbill Cr	HKS00096	HKS236	d	other	Valley	67	3	5/8/95	137	21	95.5	8	72.7	28.5	46.5	10.2	28.7	27.7	53.8	5.8	94.2	24.1	100.0	4.3	84.4	72.0
Hawksbill Cr	HKS00096	HKS414	d	other	Valley	67	3	10/3/95	101	20	90.9	8	72.7	25.7	42.0	18.8	52.8	28.7	55.6	3.0	97.0	39.6	87.2	4.1	87.2	73.2
Hawksbill Cr	HKS00096	HKS2723	v	other	Valley	67	3	10/19/99	133	24	100.0	9	81.8	44.4	72.4	6.0	16.9	42.1	81.6	0.8	99.2	41.4	84.7	4.0	88.6	78.2
Hawksbill Cr	HKS00096	HKS2837	v	other	Valley	67	3	10/20/00	112	15	68.2	6	54.5	54.5	88.9	3.6	10.0	38.4	74.4	2.7	97.3	53.6	67.1	3.7	93.2	69.2
Hawksbill Cr	HKS00096	HKS2778	v	other	Valley	67	3	11/15/00	141	17	77.3	8	72.7	51.8	84.5	0.0	0.0	23.4	45.4	7.1	92.9	41.1	85.0	4.4	83.0	67.6
Holmans Cr	HMN00209	HMN415	d	other	Valley	67	2	10/25/95	118	17	77.3	5	45.5	22.9	37.4	3.4	9.5	47.5	92.0	11.0	89.0	36.4	91.8	5.2	70.6	64.1
Holmans Cr	HMN00209	HMN552	d	str	Valley	67	2	6/5/96	128	15	68.2	6	54.5	21.1	34.4	0.0	0.0	5.5	10.6	32.0	68.0	50.0	72.2	5.7	63.4	46.4
Holmans Cr	HMN00209	HMN692	d	other	Valley	67	2	10/16/96	113	13	59.1	7	63.6	31.9	52.0	0.9	2.5	1.8	3.4	18.6	81.4	47.8	75.4	5.2	70.7	51.0
Holmans Cr	HMN00209	HMN795	d	other	Valley	67	2	5/29/97	156	13	59.1	6	54.5	42.3	69.1	0.0	0.0	9.6	18.6	8.3	91.7	48.7	74.1	4.9	75.4	55.3
Holmans Cr	HMN00209	HMN969	d	other	Valley	67	2	10/8/97	113	11	50.0	5	45.5	25.7	41.9	3.5	9.9	23.9	46.3	6.2	93.8	61.1	56.2	4.8	75.7	52.4
Holmans Cr	HMN00209	HMN1296	d	str	Valley	67	2	10/27/98	97	10	45.5	5	45.5	15.5	25.2	11.3	31.8	10.3	20.0	8.2	91.8	67.0	47.7	5.1	71.8	47.4
Holmans Cr	HMN00209	HMN1423	v	other	Valley	67	2	5/19/99	142	7	31.8	4	36.4	26.8	43.7	0.0	0.0	43.7	84.6	14.1	85.9	58.5	60.0	4.7	77.3	52.5
Holmans Cr	HMN00209	HMN2726	v	other	Valley	67	2	10/14/99	110	15	68.2	6	54.5	20.9	34.1	3.6	10.2	51.8	100.0	4.5	95.5	59.1	59.1	4.8	76.0	62.2
Holmans Cr	HMN00209	HMN2779	v	other	Valley	67	2	5/19/00	280	16	72.7	7	63.6	10.4	16.9	2.5	7.0	23.6	45.7	43.9	56.1	66.4	48.5	5.3	68.5	47.4
Holmans Cr	HMN00209	HMN2838	v	other	Valley	67	2	10/27/00	108	16	72.7	7	63.6	20.4	33.3	7.4	20.8	38.9	75.4	9.3	90.7	52.8	68.2	4.8	76.7	62.7
Holmans Cr	HMN00209	HMN2975	v	other	Valley	67	2	5/24/02	210	16	72.7	8	72.7	13.8	22.5	0.5	1.3	37.1	72.0	25.7	74.3	55.7	64.0	5.1	71.6	56.4
Holmans Cr	HMN00209	HMN2976	v	other	Valley	67	2	5/24/02	198	14	63.6	6	54.5	8.1	13.2	0.0	0.0	26.3	50.9	33.8	66.2	62.1	54.7	5.3	69.5	46.6
Holmans Cr	HMN00503	HMN691	d	other	Valley	67	2	10/16/96	108	11	50.0	4	36.4	3.7	6.0	7.4	20.8	1.9	3.6	31.5	68.5	62.0	54.8	5.9	59.7	37.5
Holmans Cr	HMN00503	HMN794	d	other	Valley	67	2	5/29/97	104	16	72.7	5	45.5	10.6	17.3	1.0	2.7	4.8	9.3	32.7	67.3	51.0	70.8	6.0	58.2	43.0
Holmans Cr	HMN00503	HMN968	d	other	Valley	67	2	10/8/97	124	11	50.0	4	36.4	13.7	22.4	49.2	100.0	15.3	29.7	2.4	97.6	75.0	36.1	4.1	87.1	57.4
Holmans Cr	HMN00503	HMN1309	d	other	Valley	67	2	10/27/98	121	10	45.5	6	54.5	12.4	20.2	5.8	16.2	16.5	32.0	1.7	98.3	79.3	29.8	5.4	68.0	45.6
Holmans Cr	HMN00503	HMN1418	v	other	Valley	67	2	5/19/99	136	18	81.8	9	81.8	22.1	36.0	1.5	4.1	24.3	47.0	41.2	58.8	55.9	63.7	5.1	71.4	55.6
Holmans Cr	HMN00503	HMN2727	v	other	Valley	67	2	10/14/99	101	14	63.6	3	27.3	2.0	3.2	0.0	0.0	42.6	82.5	21.8	78.2	54.5	65.8	5.4	68.2	48.6
Holmans Cr	HMN00503	HMN2780	v	other	Valley	67	2	5/19/00	262	13	59.1	5	45.5	8.0	13.1	1.9	5.4	12.2	23.7	50.0	50.0	74.8	36.4	5.6	64.4	37.2
Holmans Cr	HMN00503	HMN2839	v	other	Valley	67	2	10/27/00	97	12	54.5	6	54.5	24.7	40.4	38.1	100.0	19.6	38.0	8.2	91.8	53.6	67.0	4.5	80.1	65.8
Holmans Cr	HMN00503	HMN2974	v	other	Valley	67	2	5/24/02	148	11	50.0	5	45.5	35.8	58.5	2.0	5.7	18.9	36.7	35.1	64.9	48.6	74.2	5.0	73.6	51.1
Holmans Cr	HMN00759	HMN708	d	str	Valley	67	2	10/16/96	109	12	54.5	4	36.4	7.3	12.0	5.5	15.5	13.8	26.7	11.0	89.0	58.7	59.6	5.8	62.4	44.5
Holmans Cr	HMN00759	HMN793	d	other	Valley	67	2	5/29/97	112	11	50.0	3	27.3	6.3	10.2	0.0	0.0	12.5	24.2	14.3	85.7	72.3	40.0	5.8	61.5	37.4
Holmans Cr	HMN00759	HMN967	d	other	Valley	67	2	10/8/97	122	13	59.1	5	45.5	13.1	21.4	4.1	11.5	15.6	30.2	4.9	95.1	61.5	55.6	5.5	66.2	48.1
Holmans Cr	HMN00759	HMN1316	d	other	Valley	67	2	10/27/98	102	8	36.4	2	18.2	14.7	24.0	0.0	0.0	32.4	62.7	2.9	97.1	74.5	36.8	5.3	69.2	43.0
Holmans Cr	HMN00759	HMN1401	v	other	Valley	67	2	5/19/99	157	9	40.9	4	36.4	5.7	9.4	0.0	0.0	22.3	43.2	67.5	32.5	85.4	21.2	5.5	66.2	31.2
Holmans Cr	HMN00759	HMN2728	v	other	Valley	67	2	10/14/99	119	10	45.5	4	36.4	16.0	26.1	0.0	0.0	26.9	52.1	45.4	54.6	63.9	52.2	5.3	69.5	42.0
Holmans Cr	HMN00759	HMN2781	v	other	Valley	67	2	5/19/00	170	9	40.9	4	36.4	5.9	9.6	0.0	0.0	15.3	29.6	78.8	21.2	90.6	13.6	5.7	63.9	26.9
Holmans Cr	HMN00759	HMN2840	v	other	Valley	67	2	10/27/00	113	6	27.3	3	27.3	7.1	11.6	1.8	5.0	13.3	25.7	11.5	88.5	85.0	21.7	5.7	62.9	33.8
Holmans Cr	HMN00759	HMN2973	v	other	Valley	67	2	5/17/02	164	13	59.1	4	36.4	8.5	13.9	0.6	1.7	25.6	49.6	42.1	57.9	61.0	56.4	5.4	67.2	42.8
Hogue Cr	HOC00623	HOC966	d	other	Valley	67	2	10/7/97	126	15	68.2	5	45.5	11.1	18.1	40.5	100.0	19.0	36.9	1.6	98.4	50.8	71.1	4.3	84.3	65.3
Hogue Cr	HOC00623	HOC1327	d	other	Valley	67	2	10/9/98	147	12	54.5	5	45.5	45.6	74.4	23.8	66.8	19.7	38.2	4.1	95.9	55.1	64.9	3.6	94.5	66.8
Hogue Cr	HOC00623	HOC1416	v	str	Valley	67	2	5/10/99	106	15	68.2	8	72.7	25.5	41.6	6.6	18.5	21.7	42.1	37.7	62.3	46.2	77.7	4.9	75.0	57.3
Hogue Cr	HOC00623	HOC2725	v	str	Valley	67	2	10/20/99	136	12	54.5	5	45.5	27.2	44.4	10.3	28.9	26.5	51.3	24.3	75.7	42.6	82.8	4.4	81.6	58.1
Hogue Cr	HOC00623	HOC2782	v	str	Valley	67	2	4/12/00	110	13	59.1	8	72.7	28.2	46.0	13.6	38.3	2.7	5.3	12.7	87.3	51.8	69.6	4.7	78.3	57.1
Hogue Cr	HOC00623	HOC2927	v	str	Valley	67	2	10/10/01	113	16	72.7	8	72.7	41.6	67.9	16.8	47.2	25.7	49.7	8.8	91.2	37.2	90.8	4.4	82.8	71.9
Horsepen Br	HOI00408	HOI6352	v	str	Piedmont	45	1	5/18/01	23	5	22.7	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	52.2	69.1	5.7	63.9	32.0
Hot Springs Rui	HSR00403	HSR2783	v	other	Valley	67		5/2/00	167	9	40.9	4	36.4	47.3	77.2	0.0	0.0	13.8	26.7	28.7	71.3	72.5	39.8	5.1	72.1	45.5
Hot Springs Rui	HSR00409	HSR2784	v	other	Valley	67		5/2/00	116	9	40.9	4	36.4	54.3	88.7	0.0	0.0	15.5	30.1	19.0	81.0	67.2	47.3	4.7	77.4	50.2
Hutton Cr	HTO00007	HTO2156	v	other	SWest	67	4	3/8/01	173	16	72.7	9	81.8	45.1	73.6	10.4	29.2	30.6	59.4	6.4	93.6	50.9	71.0	4.3	83.7	70.6
Hughes R	HUE00020	HUE170	d	other	Northern	64	2	9/23/94	111	14	63.6	5	45.5	30.6	50.0	20.7	58.2	20.7	40.2	3.6	96.4	35.1	93.7	3.8	91.3	67.4

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Hughes R	HUE00020	HUE335	d	other	Northern	64	2	4/17/95	103	14	63.6	6	54.5	48.5	79.2	8.7	24.5	17.5	33.9	1.0	99.0	41.7	84.1	3.9	89.2	66.0
Hughes R	HUE00020	HUE461	d	other	Northern	64	2	9/27/95	97	16	72.7	6	54.5	30.9	50.5	11.3	31.8	24.7	48.0	4.1	95.9	41.2	84.9	4.6	79.7	64.8
Hughes R	HUE00020	HUE583	d	other	Northern	64	2	4/12/96	90	12	54.5	6	54.5	66.7	100.0	6.7	18.7	28.9	56.0	1.1	98.9	51.1	70.6	3.9	90.3	68.0
Hughes R	HUE00020	HUE652	d	other	Northern	64	2	10/17/96	101	16	72.7	6	54.5	33.7	55.0	9.9	27.8	21.8	42.2	2.0	98.0	46.5	77.2	4.4	82.5	63.8
Hughes R	HUE00020	HUE907	d	other	Northern	64	2	4/2/97	109	14	63.6	6	54.5	67.9	100.0	8.3	23.2	23.9	46.2	1.8	98.2	54.1	66.3	3.7	93.0	68.1
Hughes R	HUE00020	HUE932	d	other	Northern	64	2	10/7/97	203	19	86.4	7	63.6	36.0	58.7	8.4	23.5	19.7	38.2	1.0	99.0	40.4	86.1	4.4	82.5	67.3
Hughes R	HUE00020	HUE1221	d	other	Northern	64	2	3/30/98	139	14	63.6	8	72.7	58.3	95.1	12.9	36.3	28.1	54.4	5.0	95.0	43.2	82.1	3.9	89.0	73.5
Hughes R	HUE00020	HUE1271	d	other	Northern	64	2	10/28/98	181	15	68.2	7	63.6	59.1	96.5	9.9	27.9	21.0	40.7	0.6	99.4	54.1	66.2	3.5	95.3	69.7
Hughes R	HUE00020	HUE1430	v	other	Northern	64	2	9/28/99	99	16	72.7	5	45.5	40.4	66.0	4.0	11.3	19.2	37.2	2.0	98.0	48.5	74.4	4.1	87.3	61.6
Hughes R	HUE00020	HUE2775	v	other	Northern	64	2	3/8/00	160	15	68.2	7	63.6	75.6	100.0	0.0	0.0	9.4	18.2	3.1	96.9	64.4	51.5	3.6	94.7	61.6
Hughes R	HUE00020	HUE2797	v	other	Northern	64	2	11/8/00	139	14	63.6	8	72.7	48.2	78.7	4.3	12.1	23.0	44.6	0.0	100.0	43.2	82.1	4.3	84.5	67.3
Hughes R	HUE00020	HUE2979	v	other	Northern	64	2	5/1/01	115	9	40.9	7	63.6	67.0	100.0	12.2	34.2	29.6	57.3	0.0	100.0	56.5	62.8	3.9	88.9	68.5
Hughes R	HUE00020	HUE3005	v	other	Northern	64	2	9/20/01	96	9	40.9	5	45.5	46.9	76.5	0.0	0.0	33.3	64.6	0.0	100.0	49.0	73.7	4.4	82.0	60.4
Hughes R	HUE00020	HUE3006	v	other	Northern	64	2	9/20/01	96	9	40.9	5	45.5	46.9	76.5	0.0	0.0	33.3	64.6	0.0	100.0	49.0	73.7	4.4	82.0	60.4
Hughes R	HUE00020	HUE3020	v	other	Northern	64	2	4/2/02	105	13	59.1	8	72.7	61.0	99.5	7.6	21.4	9.5	18.5	0.0	100.0	62.9	53.7	4.2	85.0	63.7
Hays Cr	HYS00141	HYS970	d	other	Valley	67	3	9/24/97	104	16	72.7	6	54.5	25.0	40.8	1.0	2.7	34.6	67.1	3.8	96.2	41.3	84.7	4.4	82.0	62.6
Hays Cr	HYS00141	HYS2724	v	other	Valley	67	3	10/15/99	114	15	68.2	7	63.6	41.2	67.3	2.6	7.4	49.1	95.2	14.0	86.0	46.5	77.3	4.5	80.8	68.2
Hays Cr	HYS00141	HYS2785	v	other	Valley	67	3	5/15/00	236	14	63.6	8	72.7	44.1	71.9	1.3	3.6	40.7	78.8	9.3	90.7	48.3	74.7	4.3	83.1	67.4
Hays Cr	HYS00141	HYS2841	v	other	Valley	67	3	10/30/00	275	20	90.9	11	100.0	18.9	30.9	4.7	13.3	39.3	76.1	26.2	73.8	55.3	64.6	4.7	77.8	65.9
Indian Cr	IDI00055	IDI488	d	other	SWest	67	3	5/21/96	111	20	90.9	11	100.0	11.7	19.1	15.3	43.0	62.2	100.0	4.5	95.5	45.0	79.4	4.0	88.2	77.0
Johns Cr	JHN00001	JHN1060	d	str	WCentral	45	2	10/17/97	88	8	36.4	3	27.3	4.5	7.4	0.0	0.0	3.4	6.6	2.3	97.7	89.8	14.8	5.8	62.3	31.6
Johns Cr	JHN00001	JHN1407	v	other	WCentral	45	2	4/7/99	44	8	36.4	4	36.4	13.6	22.3	0.0	0.0	4.5	8.8	27.3	72.7	72.7	39.4	5.6	64.5	35.1
Johns Cr	JHN00001	JHN1512	v	other	WCentral	45	2	5/15/00	90	9	40.9	4	36.4	6.7	10.9	0.0	0.0	4.4	8.6	15.6	84.4	74.4	36.9	5.8	61.7	35.0
Jackson R	JKS00667	JKS5	d	other	WCentral	67	4	11/4/94	96	13	59.1	4	36.4	7.3	11.9	1.0	2.9	18.8	36.3	1.0	99.0	64.6	51.2	6.0	58.5	44.4
Jackson R	JKS00667	JKS195	d	other	WCentral	67	4	5/24/95	110	12	54.5	3	27.3	2.7	4.5	0.9	2.6	18.2	35.2	9.1	90.9	68.2	46.0	5.6	64.3	40.7
Jackson R	JKS00667	JKS738	d	other	WCentral	67	4	10/21/96	101	7	31.8	1	9.1	0.0	0.0	0.0	0.0	5.9	11.5	22.8	77.2	73.3	38.6	6.2	55.7	28.0
Jackson R	JKS00667	JKS880	d	other	WCentral	67	4	5/9/97	97	13	59.1	3	27.3	18.6	30.3	0.0	0.0	9.3	18.0	18.6	81.4	47.4	75.9	5.9	60.1	44.0
Jackson R	JKS00667	JKS1031	d	other	WCentral	67	4	10/15/97	86	11	50.0	2	18.2	0.0	0.0	1.2	3.3	20.9	40.6	9.3	90.7	58.1	60.5	6.4	53.1	39.5
Jackson R	JKS00667	JKS1160	d	other	WCentral	67	4	6/2/98	126	17	77.3	5	45.5	6.3	10.4	2.4	6.7	22.2	43.1	4.8	95.2	53.2	67.6	5.8	62.0	51.0
Jackson R	JKS00667	JKS1333	d	other	WCentral	67	4	11/19/98	79	10	45.5	2	18.2	5.1	8.3	0.0	0.0	15.2	29.4	10.1	89.9	51.9	69.5	6.9	45.6	38.3
Jackson R	JKS00667	JKS1390	v	other	WCentral	67	4	4/6/99	110	17	77.3	3	27.3	1.8	3.0	0.9	2.6	9.1	17.6	29.1	70.9	51.8	69.6	6.3	53.8	40.3
Jackson R	JKS00667	JKS1480	v	other	WCentral	67	4	11/30/99	106	12	54.5	2	18.2	11.3	18.5	0.0	0.0	16.0	31.1	5.7	94.3	50.9	70.9	6.1	56.7	43.0
Jackson R	JKS00667	JKS1488	v	other	WCentral	67	4	4/13/00	126	11	50.0	3	27.3	6.3	10.4	0.0	0.0	7.9	15.4	22.2	77.8	61.9	55.0	5.9	60.4	37.0
Jackson R	JKS00667	JKS1561	v	other	WCentral	67	4	11/2/00	205	14	63.6	2	18.2	10.2	16.7	0.0	0.0	18.0	35.0	3.9	96.1	62.0	55.0	6.2	56.4	42.6
Jackson R	JKS00667	JKS1601	v	other	WCentral	67	4	5/1/01	120	15	68.2	4	36.4	8.3	13.6	0.0	0.0	13.3	25.8	33.3	66.7	56.7	62.6	6.3	53.9	40.9
Jackson R	JKS01329	JKS4	d	str	WCentral	67	4	11/3/94	103	11	50.0	1	9.1	0.0	0.0	0.0	0.0	11.7	22.6	12.6	87.4	68.9	44.9	6.2	56.5	33.8
Jackson R	JKS01329	JKS194	d	other	WCentral	67	4	5/24/95	117	15	68.2	3	27.3	8.5	14.0	0.9	2.4	23.9	46.4	7.7	92.3	59.0	59.3	5.6	63.9	46.7
Jackson R	JKS01329	JKS737	d	other	WCentral	67	4	11/6/96	125	9	40.9	2	18.2	0.0	0.0	4.0	11.2	8.8	17.1	6.4	93.6	73.6	38.1	5.9	60.4	34.9
Jackson R	JKS01329	JKS878	d	other	WCentral	67	4	5/9/97	95	13	59.1	5	45.5	34.7	56.7	3.2	8.9	22.1	42.8	21.1	78.9	51.6	69.9	4.8	77.0	54.9
Jackson R	JKS01329	JKS1030	d	str	WCentral	67	4	10/15/97	103	10	45.5	1	9.1	0.0	0.0	0.0	0.0	16.5	32.0	7.8	92.2	48.5	74.3	6.9	45.4	37.3
Jackson R	JKS01329	JKS1173	d	other	WCentral	67	4	6/1/98	108	13	59.1	5	45.5	11.1	18.1	2.8	7.8	12.0	23.3	16.7	83.3	62.0	54.8	5.4	67.9	45.0
Jackson R	JKS01329	JKS1332	d	other	WCentral	67	4	11/19/98	151	10	45.5	2	18.2	0.0	0.0	1.3	3.7	5.3	10.3	10.6	89.4	68.2	45.9	6.0	59.2	34.0
Jackson R	JKS01329	JKS1389	v	other	WCentral	67	4	4/6/99	119	15	68.2	3	27.3	0.8	1.4	0.0	0.0	7.6	14.7	37.0	63.0	79.0	30.3	6.1	57.9	32.9
Jackson R	JKS01329	JKS1479	v	other	WCentral	67	4	11/30/99	134	14	63.6	2	18.2	0.0	0.0	0.7	2.1	17.2	33.3	14.2	85.8	44.0	80.8	6.0	58.6	42.8
Jackson R	JKS01329	JKS1487	v	other	WCentral	67	4	4/13/00	85	9	40.9	2	18.2	9.4	15.4	0.0	0.0	1.2	2.3	61.2	38.8	61.2	56.1	6.5	51.3	27.9
Jackson R	JKS01329	JKS1560	v	other	WCentral	67	4	11/2/00	276	10	45.5	2	18.2	0.0	0.0	0.4	1.0	3.3	6.3	5.1	94.9	84.8	22.0	6.4	52.5	30.1
Jackson R	JKS01868	JKS3	d	other	WCentral	67	4	11/3/94	111	13	59.1	2	18.2	0.0	0.0	1.8	5.1	6.3	12.2	0.0	100.0	72.1	40.3	5.8	61.3	37.0
Jackson R	JKS01868	JKS193	d	other	WCentral	67	4	5/23/95	155	19	86.4	7	63.6	4.5	7.4	4.5	12.7	7.1	13.8	1.3	98.7	75.5	35.4	5.4	67.0	48.1
Jackson R	JKS01868	JKS373	d	other	WCentral	67	4	12/4/95	124	15	68.2	3	27.3	0.8	1.3	2.4	6.8	8.9	17.2	4.0	96.0	64.5	51.3	6.1	57.6	40.7

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Jackson R	JKS01868	JKS524	d	other	WCentral	67	4	6/3/96	92	12	54.5	7	63.6	5.4	8.9	9.8	27.5	9.8	19.0	29.3	70.7	62.0	55.0	5.3	69.3	46.1
Jackson R	JKS01868	JKS736	d	other	WCentral	67	4	11/6/96	119	14	63.6	7	63.6	2.5	4.1	2.5	7.1	11.8	22.8	4.2	95.8	81.5	26.7	5.5	66.3	43.8
Jackson R	JKS01868	JKS877	d	other	WCentral	67	4	5/12/97	110	14	63.6	7	63.6	49.1	80.1	6.4	17.9	18.2	35.2	12.7	87.3	58.2	60.4	4.3	83.1	61.4
Jackson R	JKS01868	JKS861	d	other	WCentral	67	4	6/20/97	111	12	54.5	5	45.5	3.6	5.9	4.5	12.6	18.9	36.7	22.5	77.5	64.9	50.8	5.2	70.0	44.2
Jackson R	JKS01868	JKS1029	d	other	WCentral	67	4	10/7/97	147	12	54.5	6	54.5	8.2	13.3	14.3	40.1	10.9	21.1	4.1	95.9	65.3	50.1	4.8	75.8	50.7
Jackson R	JKS01868	JKS1169	d	other	WCentral	67	4	6/1/98	115	16	72.7	8	72.7	13.9	22.7	27.8	78.1	2.6	5.1	6.1	93.9	54.8	65.3	4.4	82.3	61.6
Jackson R	JKS01868	JKS1335	d	other	WCentral	67	4	11/24/98	124	16	72.7	5	45.5	4.0	6.6	8.1	22.6	18.5	35.9	4.8	95.2	44.4	80.4	5.2	70.2	53.6
Jackson R	JKS01868	JKS1388	v	other	WCentral	67	4	4/6/99	122	16	72.7	4	36.4	4.9	8.0	0.0	0.0	8.2	15.9	35.2	64.8	75.4	35.5	5.8	61.6	36.9
Jackson R	JKS01868	JKS1478	v	other	WCentral	67	4	11/30/99	106	17	77.3	5	45.5	3.8	6.2	0.0	0.0	16.0	31.1	17.9	82.1	43.4	81.8	6.0	59.3	47.9
Jackson R	JKS01868	JKS1486	v	other	WCentral	67	4	4/13/00	100	11	50.0	3	27.3	6.0	9.8	0.0	0.0	0.0	0.0	61.0	39.0	61.0	56.3	6.8	46.7	28.6
Jackson R	JKS01868	JKS1559	v	other	WCentral	67	4	11/2/00	250	12	54.5	3	27.3	0.4	0.7	0.4	1.1	1.2	2.3	10.4	89.6	79.6	29.5	6.0	59.0	33.0
Jackson R	JKS02140	JKS882	d	other	WCentral	67	4	6/20/97	102	12	54.5	4	36.4	4.9	8.0	1.0	2.8	3.9	7.6	7.8	92.2	76.5	34.0	5.9	59.9	36.9
Jackson R	JKS02361	JKS2	d	str	WCentral	67	4	11/3/94	133	11	50.0	1	9.1	0.0	0.0	0.0	0.0	2.3	4.4	15.0	85.0	57.1	61.9	7.9	30.5	30.1
Jackson R	JKS02361	JKS192	d	other	WCentral	67	4	5/23/95	143	5	22.7	1	9.1	0.7	1.1	0.0	0.0	0.0	0.0	0.0	100.0	88.1	17.2	7.1	43.0	24.1
Jackson R	JKS02361	JKS374	d	other	WCentral	67	4	12/4/95	101	6	27.3	0	0.0	0.0	0.0	0.0	0.0	5.9	11.5	0.0	100.0	82.2	25.7	8.0	30.0	24.3
Jackson R	JKS02361	JKS528	d	other	WCentral	67	4	5/13/96	107	7	31.8	3	27.3	4.7	7.6	1.9	5.2	0.0	0.0	23.4	76.6	46.7	76.9	7.2	41.2	33.3
Jackson R	JKS02361	JKS735	d	str	WCentral	67	4	11/6/96	160	3	13.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	93.8	93.8	9.0	9.3	10.1	15.8
Jackson R	JKS02361	JKS846	d	str	WCentral	67	4	5/12/97	97	5	22.7	2	18.2	19.6	32.0	1.0	2.9	0.0	0.0	4.1	95.9	75.3	35.7	8.1	28.0	29.4
Jackson R	JKS02361	JKS873	d	other	WCentral	67	4	6/20/97	102	6	27.3	2	18.2	1.0	1.6	2.9	8.3	1.0	1.9	9.8	90.2	85.3	21.2	6.1	57.1	28.2
Jackson R	JKS02361	JKS1028	d	str	WCentral	67	4	10/7/97	104	5	22.7	1	9.1	0.0	0.0	0.0	0.0	2.9	5.6	43.3	56.7	86.5	19.4	7.7	33.5	18.4
Jackson R	JKS02361	JKS1172	d	other	WCentral	67	4	6/1/98	103	7	31.8	3	27.3	1.0	1.6	1.0	2.7	1.0	1.9	0.0	100.0	87.4	18.2	8.9	16.0	24.9
Jackson R	JKS02361	JKS1331	d	str	WCentral	67	4	11/24/98	151	6	27.3	1	9.1	0.0	0.0	0.0	0.0	2.0	3.9	17.9	82.1	55.6	64.1	6.8	47.2	29.2
Jackson R	JKS02361	JKS1387	v	other	WCentral	67	4	3/8/99	126	10	45.5	0	0.0	0.0	0.0	0.0	0.0	16.7	32.3	7.9	92.1	50.8	71.1	8.0	30.0	33.9
Jackson R	JKS02361	JKS1477	v	other	WCentral	67	4	11/30/99	119	8	36.4	0	0.0	0.0	0.0	0.0	0.0	14.3	27.7	6.7	93.3	53.8	66.8	7.6	35.3	32.4
Jackson R	JKS02361	JKS1484	v	other	WCentral	67	4	4/13/00	69	7	31.8	3	27.3	33.3	54.4	0.0	0.0	0.0	0.0	26.1	73.9	56.5	62.8	6.6	50.3	37.6
Jackson R	JKS02361	JKS1558	v	other	WCentral	67	4	11/2/00	211	8	36.4	1	9.1	0.0	0.0	0.0	0.0	3.3	6.4	6.6	93.4	82.9	24.6	6.2	56.5	28.3
Jackson R	JKS02361	JKS1600	v	other	WCentral	67	4	5/1/01	146	9	40.9	2	18.2	0.7	1.1	0.7	1.9	5.5	10.6	28.8	71.2	61.6	55.4	6.7	48.8	31.0
Jackson R	JKS02361	JKS1667	v	other	WCentral	67	4	12/18/01	101	8	36.4	2	18.2	0.0	0.0	1.0	2.8	6.9	13.4	5.9	94.1	56.4	62.9	7.1	42.8	33.8
Jackson R	JKS03901	JKS1394	v	other	WCentral	67		3/8/99	137	14	63.6	9	81.8	31.4	51.2	16.1	45.1	7.3	14.1	9.5	90.5	34.3	94.9	4.1	87.4	66.1
Jackson R	JKS04341	JKS1395	v	other	WCentral	67		3/8/99	185	5	22.7	2	18.2	1.1	1.8	0.0	0.0	0.0	0.0	64.9	35.1	81.6	26.5	6.3	54.8	19.9
Johns Cr	JOB00039	JOB198	d	other	WCentral	67	4	5/18/95	62	15	68.2	6	54.5	30.6	50.0	11.3	31.7	41.9	81.3	1.6	98.4	53.2	67.6	3.7	92.9	68.1
Johns Cr	JOB00039	JOB375	d	other	WCentral	67	4	11/16/95	87	13	59.1	6	54.5	40.2	65.7	17.2	48.4	41.4	80.2	0.0	100.0	46.0	78.0	3.2	100.0	73.2
Johns Cr	JOB00039	JOB520	d	other	WCentral	67	4	6/4/96	78	19	86.4	9	81.8	14.1	23.0	10.3	28.8	62.8	100.0	1.3	98.7	55.1	64.8	3.9	89.9	71.7
Johns Cr	JOB00039	JOB754	d	other	WCentral	67	4	11/7/96	87	12	54.5	6	54.5	21.8	35.6	19.5	54.8	44.8	86.9	0.0	100.0	42.5	83.0	3.6	94.6	70.5
Johns Cr	JOB00039	JOB863	d	other	WCentral	67	4	5/20/97	107	14	63.6	7	63.6	26.2	42.7	19.6	55.1	52.3	100.0	1.9	98.1	51.4	70.2	3.7	92.4	73.2
Johns Cr	JOB00039	JOB1050	d	other	WCentral	67	4	10/22/97	90	13	59.1	6	54.5	35.6	58.0	20.0	56.1	43.3	84.0	0.0	100.0	37.8	89.9	3.6	94.7	74.6
Jack-O-Lantern	JOL00024	JOL1531	v	other	WCentral	45	1	8/14/00	117	23	100.0	8	72.7	17.1	27.9	17.9	50.4	37.6	72.9	1.7	98.3	27.4	100.0	3.7	93.2	76.9
Kerrs Cr	KRR00154	KRR238	d	other	Valley	67	3	5/25/95	196	21	95.5	8	72.7	28.6	46.6	6.6	18.6	28.6	55.4	10.2	89.8	41.3	84.8	4.4	82.3	68.2
Kerrs Cr	KRR00154	KRR972	d	other	Valley	67	3	10/2/97	111	14	63.6	7	63.6	31.5	51.5	28.8	80.9	17.1	33.2	2.7	97.3	49.5	72.9	3.9	89.2	69.0
Kerrs Cr	KRR00154	KRR1307	d	other	Valley	67	3	10/15/98	117	16	72.7	6	54.5	37.6	61.4	6.8	19.2	17.1	33.1	8.5	91.5	53.0	67.9	4.2	84.8	60.6
Kerrs Cr	KRR00154	KRR001.5	v	other	Valley	67	3	10/15/99	125	13	59.1	6	54.5	35.2	57.5	4.0	11.2	39.2	76.0	11.2	88.8	40.0	86.7	4.5	80.4	64.3
Kerrs Cr	KRR00154	KRR2787	v	other	Valley	67	3	5/15/00	126	14	63.6	7	63.6	23.8	38.9	3.2	8.9	51.6	100.0	15.9	84.1	54.8	65.3	4.6	79.7	63.0
Kerrs Cr	KRR00154	KRR2843	v	other	Valley	67	3	10/30/00	179	14	63.6	7	63.6	56.4	92.1	7.8	22.0	33.5	65.0	2.2	97.8	53.1	67.8	3.7	92.7	70.6
Lick Cr	LCC00065	LCC507	d	other	SWest	69	4	4/18/96	55	5	22.7	1	9.1	1.8	3.0	0.0	0.0	5.5	10.6	87.3	12.7	92.7	10.5	5.8	61.2	16.2
Lick Cr	LCC00065	LIC777	d	other	SWest	69	4	3/21/97	16	4	18.2	2	18.2	0.0	0.0	12.5	35.1	6.3	12.1	50.0	50.0	81.3	27.1	5.4	68.0	28.6
Lick Cr	LCC00065	LCC1212	d	str	SWest	69	4	6/8/98	92	8	36.4	2	18.2	4.3	7.1	0.0	0.0	2.2	4.2	65.2	34.8	81.5	26.7	5.8	61.0	23.5
Lick Cr	LCC00599	LIC776	d	other	SWest	69	3	3/21/97	12	5	22.7	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	41.7	58.3	66.7	48.1	6.2	56.3	24.3
Little Calfpastur	LCF00002	LCF1429	v	other	Valley	67	3	5/6/99	100	10	45.5	5	45.5	11.0	18.0	2.0	5.6	7.0	13.6	30.0	70.0	59.0	59.2	6.3	54.8	39.0
Little Calfpastur	LCF00002	LCF2731	v	other	Valley	67	3	10/27/99	106	8	36.4	3	27.3	2.8	4.6	0.0	0.0	1.9	3.7	24.5	75.5	87.7	17.7	6.0	58.8	28.0

Table D-2 (continued).

Name	Station ID	Sample ID	Data Set	Stream Type	DEQ Region	Eco-region	Order	Sample Date	N Ind	RTOTAL Metric	RTOTAL Score	REPT Metric	REPT Score	ZEPHM Metric	ZEPHM Score	ZPTLH Metric	ZPTLH Score	ZSCRA Metric	ZSCRA Score	ZCHIR Metric	ZCHIR Score	Z2DOM Metric	Z2DOM Score	HBI Metric	HBI Score	Virginia SCI
Little Calfpastur	LCF00002	LCF2788	v	other	Valley	67	3	5/9/00	158	8	36.4	2	18.2	1.9	3.1	0.0	0.0	0.0	0.0	84.2	15.8	84.2	22.9	6.3	54.3	18.8
Little Calfpastur	LCF00002	LCF2844	v	other	Valley	67	3	10/13/00	113	8	36.4	2	18.2	23.9	39.0	0.0	0.0	27.4	53.2	2.7	97.3	76.1	34.5	5.9	60.5	42.4
Little Calfpastur	LCF00002	LCF2928	v	other	Valley	67	3	10/29/01	109	9	40.9	6	54.5	64.2	100.0	0.9	2.6	61.5	100.0	2.8	97.2	89.0	15.9	4.7	77.9	61.1
Little Calfpastur	LCF00076	LCF65	d	other	Valley	67	3	10/12/94	122	8	36.4	2	18.2	0.0	0.0	0.8	2.3	0.0	0.0	20.5	79.5	73.0	39.1	6.8	47.5	27.9
Little Calfpastur	LCF00076	LCF242	d	other	Valley	67	3	5/10/95	109	7	31.8	2	18.2	0.9	1.5	0.0	0.0	0.0	0.0	13.8	86.2	79.8	29.2	6.3	53.8	27.6
Little Calfpastur	LCF00076	LCF419	d	str	Valley	67	3	10/17/95	111	9	40.9	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	7.2	92.8	83.8	23.4	6.2	56.0	27.8
Little Calfpastur	LCF00076	LCF557	d	other	Valley	67	3	6/6/96	138	8	36.4	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	16.7	83.3	84.1	23.0	6.2	56.5	26.1
Little Calfpastur	LCF00076	LCF797	d	str	Valley	67	3	5/28/97	143	7	31.8	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	13.3	86.7	81.8	26.3	6.3	54.1	26.0
Little Calfpastur	LCF00076	LCF975	d	str	Valley	67	3	9/24/97	106	6	27.3	1	9.1	0.0	0.0	0.0	0.0	1.9	3.7	28.3	71.7	80.2	28.6	7.4	38.5	22.4
Little Calfpastur	LCF00076	LCF1322	d	other	Valley	67	3	10/29/98	125	6	27.3	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	16.8	83.2	77.6	32.4	7.2	41.6	24.2
Little Calfpastur	LCF00076	LCF1426	v	other	Valley	67	3	5/6/99	151	6	27.3	1	9.1	0.0	0.0	0.7	1.9	0.0	0.0	25.2	74.8	90.1	14.3	6.1	57.2	23.1
Little Calfpastur	LCF00076	LCF2732	v	other	Valley	67	3	10/27/99	136	4	18.2	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	62.5	37.5	97.1	4.2	6.0	58.6	16.0
Little Calfpastur	LCF00076	LCF2789	v	other	Valley	67	3	5/9/00	192	7	31.8	2	18.2	2.1	3.4	0.0	0.0	0.0	0.0	56.8	43.2	83.3	24.1	6.3	54.3	21.9
Little Calfpastur	LCF00076	LCF2845	v	other	Valley	67	3	10/13/00	156	6	27.3	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	19.2	80.8	73.7	38.0	6.4	52.5	26.0
Little Calfpastur	LCF00076	LCF2929	v	other	Valley	67	3	10/29/01	146	5	22.7	1	9.1	0.0	0.0	0.0	0.0	0.7	1.3	7.5	92.5	91.1	12.9	7.0	43.7	22.8
Little Calfpastur	LCF00076	LCF6384	v	other	Valley	67	3	5/15/02	120	9	40.9	2	18.2	0.8	1.4	0.0	0.0	3.3	6.5	27.5	72.5	90.0	14.4	6.0	58.8	26.6
Little Calfpastur	LCF00480	LCF64	d	other	Valley	67	3	10/12/94	137	20	90.9	9	81.8	34.3	56.0	8.0	22.5	33.6	65.1	4.4	95.6	37.2	90.7	3.8	91.0	74.2
Little Calfpastur	LCF00480	LCF243	d	other	Valley	67	3	5/10/95	117	24	100.0	10	90.9	33.3	54.4	13.7	38.4	28.2	54.7	13.7	86.3	25.6	100.0	4.3	83.3	76.0
Little Calfpastur	LCF00480	LCF418	d	other	Valley	67	3	10/17/95	114	11	50.0	5	45.5	34.2	55.8	32.5	91.1	15.8	30.6	0.0	100.0	59.6	58.3	3.5	95.5	65.9
Little Calfpastur	LCF00480	LCF974	d	str	Valley	67	3	9/24/97	123	14	63.6	6	54.5	24.4	39.8	35.8	100.0	13.0	25.2	1.6	98.4	52.8	68.1	3.9	90.3	67.5
Little Calfpastur	LCF00480	LCF1321	d	str	Valley	67	3	10/29/98	110	16	72.7	8	72.7	25.5	41.6	19.1	53.6	24.5	47.6	10.9	89.1	39.1	88.0	4.4	82.4	68.5
Little Calfpastur	LCF00480	LCF1427	v	other	Valley	67	3	5/6/99	107	18	81.8	8	72.7	15.0	24.4	18.7	52.5	54.2	100.0	3.7	96.3	57.0	62.1	4.0	88.2	72.3
Little Calfpastur	LCF00480	LCF2733	v	other	Valley	67	3	10/27/99	229	15	68.2	8	72.7	9.6	15.7	17.5	49.0	27.5	53.3	2.2	97.8	63.3	53.0	4.7	78.1	61.0
Little Calfpastur	LCF00480	LCF2790	v	other	Valley	67	3	5/9/00	135	14	63.6	7	63.6	20.0	32.6	8.1	22.9	51.9	100.0	5.9	94.1	50.4	71.7	4.4	81.9	66.3
Little Calfpastur	LCF00480	LCF2846	v	other	Valley	67	3	10/31/00	210	19	86.4	11	100.0	22.9	37.3	11.0	30.7	43.3	84.0	8.6	91.4	51.4	70.2	4.4	83.0	72.9
Little Calfpastur	LCF00480	LCF2930	v	other	Valley	67	3	10/29/01	258	13	59.1	7	63.6	14.7	24.0	28.3	79.4	25.2	48.8	0.8	99.2	62.0	54.9	4.4	82.4	63.9
Little Calfpastur	LCF01083	LCF556	d	other	Valley	67	3	5/14/96	118	26	100.0	13	100.0	41.5	67.8	11.0	30.9	22.0	42.7	19.5	80.5	35.6	93.0	4.4	82.1	74.6
Little Dark Run	LDR00070	LDR164	d	other	Northern	64	2	9/21/94	116	18	81.8	7	63.6	31.9	52.1	19.8	55.7	23.3	45.1	3.4	96.6	31.9	98.4	4.0	88.0	72.7
Little Dark Run	LDR00070	LDR342	d	other	Northern	64	2	5/5/95	112	17	77.3	9	81.8	46.4	75.8	24.1	67.7	18.8	36.3	0.9	99.1	40.2	86.4	3.8	91.3	77.0
Little Dark Run	LDR00070	LDR465	d	other	Northern	64	2	10/2/95	103	12	54.5	5	45.5	38.8	63.4	18.4	51.8	21.4	41.4	1.0	99.0	38.8	88.3	4.0	88.2	66.5
Little Dark Run	LDR00070	LDR587	d	other	Northern	64	2	5/16/96	152	14	63.6	7	63.6	51.3	83.8	15.8	44.3	31.6	61.2	1.3	98.7	48.7	74.1	4.2	85.5	71.9
Little Dark Run	LDR00070	LDR658	d	other	Northern	64	2	10/28/96	126	17	77.3	6	54.5	31.7	51.8	10.3	29.0	27.8	53.8	0.8	99.2	60.3	57.3	4.7	78.0	62.6
Little Dark Run	LDR00070	LDR910	d	other	Northern	64	2	4/7/97	121	14	63.6	6	54.5	54.5	89.0	5.8	16.2	28.1	54.5	2.5	97.5	54.5	65.7	4.4	82.1	65.4
Little Dark Run	LDR00070	LDR1225	d	other	Northern	64	2	3/31/98	121	16	72.7	8	72.7	51.2	83.6	9.9	27.8	19.8	38.4	3.3	96.7	42.1	83.6	4.3	83.4	69.9
Little Dark Run	LDR00070	LDR1274	d	other	Northern	64	2	11/9/98	131	18	81.8	8	72.7	47.3	77.3	19.1	53.6	32.8	63.6	2.3	97.7	45.8	78.3	3.9	90.1	76.9
Little Dark Run	LDR00070	LDR1398	v	other	Northern	64	2	4/26/99	148	18	81.8	6	54.5	37.2	60.7	21.6	60.7	21.6	41.9	2.0	98.0	34.5	94.7	4.1	86.1	72.3
Little Dark Run	LDR00070	LDR1432	v	other	Northern	64	2	10/5/99	108	14	63.6	6	54.5	38.0	62.0	22.2	62.4	8.3	16.1	1.9	98.1	46.3	77.6	3.6	94.0	66.1
Little Dark Run	LDR00070	LDR2778	v	other	Northern	64	2	3/29/00	118	13	59.1	5	45.5	64.4	100.0	0.0	0.0	18.6	36.1	1.7	98.3	55.1	64.9	4.5	80.7	60.6
Little Dark Run	LDR00070	LDR2795	v	other	Northern	64	2	11/28/00	142	14	63.6	5	45.5	16.9	27.6	39.4	100.0	12.7	24.6	1.4	98.6	55.6	64.1	4.2	85.6	63.7
Lewis Cr	LEW00695	LEW41	d	other	Valley	67	2	10/20/94	58	6	27.3	1	9.1	0.0	0.0	0.0	0.0	1.7	3.3	13.8	86.2	89.7	14.9	6.1	57.0	24.7
Lewis Cr	LEW00695	LEW239	d	other	Valley	67	2	5/16/95	116	12	54.5	1	9.1	0.0	0.0	0.0	0.0	3.4	6.7	31.9	68.1	54.3	66.0	6.1	57.3	32.7
Lewis Cr	LEW00695	LEW416	d	other	Valley	67	2	10/10/95	138	7	31.8	1	9.1	0.0	0.0	0.0	0.0	5.8	11.2	4.3	95.7	76.1	34.5	6.3	54.9	29.7
Lewis Cr	LEW00695	LEW554	d	other	Valley	67	2	6/3/96	96	10	45.5	3	27.3	2.1	3.4	0.0	0.0	6.3	12.1	3.1	96.9	82.3	25.6	6.7	48.7	32.4
Lewis Cr	LEW00695	LEW796	d	other	Valley	67	2	5/5/97	92	6	27.3	2	18.2	1.1	1.8	0.0	0.0	0.0	0.0	67.4	32.6	80.4	28.3	6.3	54.9	20.4
Lewis Cr	LEW00695	LEW973	d	other	Valley	67	2	9/18/97	110	8	36.4	2	18.2	7.3	11.9	0.0	0.0	1.8	3.5	3.6	96.4	80.0	28.9	6.6	50.0	30.6
Lewis Cr	LEW00695	LEW2730	v	other	Valley	67	2	10/26/99	103	6	27.3	1	9.1	0.0	0.0	0.0	0.0	9.7	18.8	4.9	95.1	90.3	14.0	5.8	61.9	28.3
Lewis Cr	LEW00695	LEW2791	v	other	Valley	67	2	4/11/00	122	7	31.8	2	18.2	0.8	1.3	0.0	0.0	1.6	3.2	69.7	30.3	87.7	17.8	6.1	57.2	20.0
Lewis Cr	LEW00695	LEW2847	v	other	Valley	67	2	10/16/00	111	10	45.5	2	18.2	3.6	5.9	0.0	0.0	4.5	8.7	27.0	73.0	72.1	40.3	6.0	58.8	31.3
Lewis Cr	LEW00695	LEW6380	v	other	Valley	67	2	5/28/02	110	9	40.9	3	27.3	11.8	19.3	0.0	0.0	7.3	14.1	30.9	69.1	56.4	63.0	5.7	63.6	37.2

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Little R	LIV00478	LIV912	d	other	Northern	64	3	4/4/97	112	13	59.1	4	36.4	54.5	88.9	0.0	0.0	27.7	53.6	1.8	98.2	50.9	70.9	4.7	78.6	60.7
Little R	LIV00478	LIV947	d	other	Northern	64	3	10/1/97	117	16	72.7	5	45.5	37.6	61.4	0.0	0.0	25.6	49.7	3.4	96.6	35.0	93.8	4.3	83.1	62.9
Little R	LIV00478	LIV1234	d	other	Northern	64	3	7/1/98	144	15	68.2	5	45.5	52.1	85.0	4.2	11.7	10.4	20.2	4.9	95.1	47.9	75.2	4.0	88.4	61.2
Little R	LIV00478	LIV1273	d	other	Northern	64	3	11/23/98	75	15	68.2	5	45.5	50.7	82.7	4.0	11.2	30.7	59.4	2.7	97.3	42.7	82.8	4.4	82.5	66.2
Little R	LIV00478	LIV00478	v	other	Northern	64	3	4/21/99	173	19	86.4	5	45.5	66.5	100.0	1.7	4.9	19.1	37.0	2.3	97.7	57.8	61.0	4.1	86.5	64.9
Little R	LIV00478	LIV1425	v	other	Northern	64	3	10/7/99	75	14	63.6	3	27.3	18.7	30.5	0.0	0.0	29.3	56.8	6.7	93.3	42.7	82.8	5.6	65.2	52.5
Little R	LIV00478	LIV2768	v	other	Northern	64	3	5/15/00	224	19	86.4	6	54.5	74.6	100.0	3.1	8.8	9.8	19.0	3.1	96.9	64.7	50.9	3.3	98.9	64.4
Little Cr	LLE00522	LLE1534	v	other	WCentral	45	2	7/26/00	275	13	59.1	5	45.5	23.3	38.0	0.0	0.0	18.5	35.9	7.3	92.7	58.9	59.4	5.0	73.0	50.5
Little Cr	LLE00522	LLE1628	v	other	WCentral	45	2	3/26/01	106	9	40.9	3	27.3	25.5	41.6	0.0	0.0	8.5	16.5	57.5	42.5	77.4	32.7	5.5	66.7	33.5
Linville Cr	LNV00016	LNV2932	v	other	Valley	67	3	10/2/01	108	18	81.8	6	54.5	27.8	45.3	0.9	2.6	71.3	100.0	0.0	100.0	63.0	53.5	4.4	82.2	65.0
Linville Cr	LNV00016	LNV2982	v	other	Valley	67	3	5/17/02	184	19	86.4	7	63.6	12.5	20.4	4.3	12.2	47.8	92.7	22.3	77.7	52.7	68.3	5.0	73.2	61.8
Linville Cr	LNV00071	LNV62	d	other	Valley	67	3	10/3/94	143	19	86.4	6	54.5	9.1	14.8	11.9	33.4	30.1	58.3	4.2	95.8	33.6	96.0	5.1	72.6	64.0
Linville Cr	LNV00071	LNV240	d	other	Valley	67	3	5/9/95	154	22	100.0	6	54.5	20.8	33.9	6.5	18.2	18.2	35.2	12.3	87.7	29.2	100.0	5.0	72.8	62.8
Linville Cr	LNV00071	LNV417	d	other	Valley	67	3	9/28/95	107	24	100.0	5	45.5	18.7	30.5	4.7	13.1	32.7	63.4	5.6	94.4	34.6	94.5	4.9	75.0	64.6
Linville Cr	LNV00071	LNV555	d	other	Valley	67	3	5/21/96	109	16	72.7	7	63.6	23.9	38.9	2.8	7.7	8.3	16.0	39.4	60.6	51.4	70.2	5.4	67.4	49.7
Linville Cr	LNV00071	LNV976	d	other	Valley	67	3	9/22/97	120	16	72.7	6	54.5	5.0	8.2	5.0	14.0	30.8	59.8	9.2	90.8	55.8	63.8	6.4	53.5	52.2
Linville Cr	LNV00071	LNV1324	d	other	Valley	67	3	10/23/98	108	14	63.6	4	36.4	7.4	12.1	0.0	0.0	56.5	100.0	8.3	91.7	50.9	70.9	5.5	65.6	55.0
Linville Cr	LNV00071	LNV1420	v	str	Valley	67	3	5/19/99	128	11	50.0	4	36.4	4.7	7.7	0.0	0.0	45.3	87.8	46.9	53.1	66.4	48.5	5.2	70.5	44.3
Linville Cr	LNV00071	LNV2981	v	str	Valley	67	3	5/17/02	129	17	77.3	4	36.4	4.7	7.6	3.9	10.9	17.1	33.1	31.0	69.0	48.8	73.9	6.9	46.0	44.3
Long Br	LOB00015	LOB1593	v	other	WCentral	45	1	6/5/01	117	10	45.5	4	36.4	17.9	29.3	0.0	0.0	6.8	13.3	60.7	39.3	71.8	40.7	5.8	62.4	33.4
Long Br	LOB00015	LOB1643	v	other	WCentral	45	1	10/22/01	114	11	50.0	5	45.5	18.4	30.1	13.2	36.9	22.8	44.2	12.3	87.7	63.2	53.2	4.9	75.2	52.9
Long Meadow	LOM00024	LOM558	d	other	Valley	67	2	6/5/96	109	9	40.9	0	0.0	0.0	0.0	0.0	0.0	9.2	17.8	36.7	63.3	56.9	62.3	6.6	50.3	29.3
Long Meadow	LOM00024	LOM693	d	other	Valley	67	2	10/16/96	97	13	59.1	1	9.1	5.2	8.4	0.0	0.0	24.7	48.0	5.2	94.8	44.3	80.4	6.1	56.7	44.6
Long Meadow	LOM00024	LOM798	d	other	Valley	67	2	5/29/97	128	14	63.6	4	36.4	5.5	8.9	0.0	0.0	19.5	37.9	36.7	63.3	54.7	65.5	5.8	61.2	42.1
Long Meadow	LOM00024	LOM978	d	other	Valley	67	2	10/8/97	127	12	54.5	3	27.3	1.6	2.6	0.8	2.2	24.4	47.3	3.1	96.9	78.0	31.8	6.8	47.7	38.8
Long Meadow	LOM00024	LOM1298	d	other	Valley	67	2	10/23/98	118	11	50.0	3	27.3	6.8	11.1	1.7	4.8	22.9	44.3	0.8	99.2	65.3	50.2	6.4	52.8	42.5
Long Meadow	LOM00024	LOM1422	v	other	Valley	67	2	5/19/99	224	12	54.5	3	27.3	1.8	2.9	0.0	0.0	8.5	16.4	73.2	26.8	84.4	22.6	6.2	56.4	25.9
Long Meadow	LOM00024	LOM2735	v	other	Valley	67	2	10/14/99	142	11	50.0	2	18.2	0.0	0.0	15.5	43.5	33.8	65.5	27.5	72.5	53.5	67.1	5.3	69.1	48.3
Long Meadow	LOM00024	LOM2792	v	other	Valley	67	2	5/19/00	331	11	50.0	2	18.2	0.0	0.0	4.5	12.7	8.5	16.4	66.5	33.5	73.7	38.0	6.0	59.1	28.5
Long Meadow	LOM00024	LOM2848	v	other	Valley	67	2	10/27/00	124	15	68.2	2	18.2	0.0	0.0	12.9	36.2	23.4	45.3	25.8	74.2	46.8	76.9	5.7	62.6	47.7
Little Otter Riv	LOR01433	LOR12	d	other	WCentral	45	2	11/2/94	103	11	50.0	6	54.5	15.5	25.4	6.8	19.1	10.7	20.7	1.9	98.1	73.8	37.9	5.2	71.0	47.1
Little Otter Riv	LOR01433	LOR207	d	other	WCentral	45	2	4/27/95	138	9	40.9	6	54.5	24.6	40.2	1.4	4.1	10.9	21.1	29.7	70.3	72.5	39.8	5.4	67.2	42.3
Little Otter Riv	LOR01433	LOR389	d	other	WCentral	45	2	12/6/95	93	9	40.9	3	27.3	24.7	40.4	0.0	0.0	3.2	6.3	4.3	95.7	83.9	23.3	5.6	65.3	37.4
Little Otter Riv	LOR01433	LOR858	d	other	WCentral	45	2	6/10/97	94	13	59.1	8	72.7	45.7	74.7	5.3	14.9	1.1	2.1	8.5	91.5	42.6	83.0	4.9	74.7	59.1
Little Otter Riv	LOR01433	LOR1051	d	other	WCentral	45	2	10/17/97	80	7	31.8	4	36.4	8.8	14.3	1.3	3.5	7.5	14.5	16.3	83.8	73.8	37.9	5.5	66.9	36.1
Little Otter Riv	LOR01433	LOR1406	v	str	WCentral	45	2	4/7/99	103	10	45.5	3	27.3	32.0	52.3	0.0	0.0	0.0	0.0	26.2	73.8	61.2	56.1	5.3	68.6	40.4
Little Otter Riv	LOR01433	LOR1472	v	str	WCentral	45	2	10/27/99	77	11	50.0	5	45.5	29.9	48.8	0.0	0.0	14.3	27.7	35.1	64.9	51.9	69.4	4.5	80.9	48.4
Little Otter Riv	LOR01433	LOR1511	v	str	WCentral	45	2	5/15/00	70	11	50.0	6	54.5	18.6	30.3	0.0	0.0	0.0	0.0	18.6	81.4	54.3	66.0	4.5	81.0	45.4
Little Otter Riv	LOR01475	LOR18	d	other	WCentral	45	2	11/2/94	119	13	59.1	6	54.5	51.3	83.7	6.7	18.9	12.6	24.4	0.8	99.2	56.3	63.1	4.0	88.0	61.4
Little Otter Riv	LOR01475	LOR208	d	other	WCentral	45	2	4/27/95	136	12	54.5	6	54.5	29.4	48.0	0.7	2.1	8.8	17.1	1.5	98.5	68.4	45.7	5.2	70.1	48.8
Little Otter Riv	LOR01475	LOR390	d	other	WCentral	45	2	12/6/95	92	9	40.9	4	36.4	28.3	46.1	0.0	0.0	7.6	14.7	2.2	97.8	83.7	23.6	5.4	67.4	40.9
Little Otter Riv	LOR01475	LOR859	d	other	WCentral	45	2	6/10/97	118	10	45.5	6	54.5	16.1	26.3	5.9	16.7	0.0	0.0	1.7	98.3	71.2	41.6	5.5	66.4	43.7
Little Otter Riv	LOR01475	LOR1405	v	other	WCentral	45	2	4/7/99	123	12	54.5	4	36.4	36.6	59.7	0.0	0.0	4.9	9.5	13.0	87.0	56.9	62.2	4.9	74.7	48.0
Little Otter Riv	LOR01475	LOR1471	v	other	WCentral	45	2	10/27/99	109	16	72.7	8	72.7	44.0	71.9	0.0	0.0	24.8	48.0	15.6	84.4	41.3	84.8	4.0	87.6	65.3
Little Otter Riv	LOR01475	LOR1510	v	other	WCentral	45	2	5/15/00	108	15	68.2	8	72.7	38.9	63.5	14.8	41.6	5.6	10.8	5.6	94.4	52.8	68.2	4.0	88.3	63.5
Little Reed Isla	LRI00181	LRI1109	d	other	SWest	67	3	11/17/97	96	16	72.7	9	81.8	8.3	13.6	29.2	81.9	34.4	66.6	4.2	95.8	52.1	69.2	4.0	88.5	71.3
Laurel Fork	LRR00139	LFK127	d	str	SWest	69	2	10/4/94	113	2	9.1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86.7	13.3	100.0	0.0	5.6	64.6	10.9
Laurel Fork	LRR00139	LRR500	d	other	SWest	69	2	4/24/96	105	3	13.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.4	8.6	96.2	5.5	6.2	55.1	10.4
Laurel Cr	LUC00168	LRL303	d	other	SWest	67	4	4/11/95	95	15	68.2	7	63.6	13.7	22.3	11.6	32.5	15.8	30.6	25.3	74.7	58.9	59.3	5.0	73.6	53.1

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Laurel Cr	LUC00168	LUC367	d	other	SWest	67	4	11/27/95	104	11	50.0	4	36.4	10.6	17.3	14.4	40.5	58.7	100.0	5.8	94.2	49.0	73.6	3.8	91.4	62.9
Laurel Cr	LUC00168	LUC781	d	other	SWest	67	4	5/22/97	101	14	63.6	7	63.6	27.7	45.3	6.9	19.5	29.7	57.6	28.7	71.3	39.6	87.2	4.6	79.7	61.0
Laurel Cr	LUC00168	LUC1083	d	other	SWest	67	4	10/7/97	130	14	63.6	6	54.5	50.0	81.6	6.9	19.4	44.6	86.5	3.1	96.9	52.3	68.9	3.5	94.8	70.8
Laurel Cr	LUC00168	LUC1195	d	other	SWest	67	4	6/29/98	116	16	72.7	8	72.7	31.0	50.7	5.2	14.5	34.5	66.8	22.4	77.6	36.2	92.1	4.5	80.6	66.0
Little Walker Cr	LWK02072	LWK1080	d	other	SWest	67	2	11/18/97	93	15	68.2	9	81.8	41.9	68.5	24.7	69.4	20.4	39.6	12.9	87.1	33.3	96.3	3.4	96.4	75.9
Little Walker Cr	LWK02072	LWK1192	d	other	SWest	67	2	4/27/98	126	12	54.5	7	63.6	61.9	100.0	14.3	40.1	14.3	27.7	4.8	95.2	54.0	66.5	3.6	93.8	67.7
Lewis Cr	LWS00090	LEW300	d	other	SWest	67	3	5/9/95	107	7	31.8	3	27.3	8.4	13.7	0.0	0.0	23.4	45.3	57.9	42.1	76.6	33.7	5.4	67.8	32.7
Lewis Cr	LWS00090	LWS362	d	other	SWest	67	3	11/30/95	110	13	59.1	3	27.3	5.5	8.9	0.0	0.0	65.5	100.0	9.1	90.9	55.5	64.3	4.2	85.2	54.5
Lewis Cr	LWS00090	LWS772	d	other	SWest	67	3	5/21/97	97	11	50.0	5	45.5	9.3	15.1	3.1	8.7	18.6	36.0	43.3	56.7	60.8	56.6	5.4	67.4	42.0
Lewis Cr	LWS00090	LWS1082	d	other	SWest	67	3	10/30/97	163	17	77.3	7	63.6	11.0	18.0	1.8	5.2	35.0	67.8	9.8	90.2	56.4	62.9	5.0	73.7	57.3
Lewis Cr	LWS00090	LWS1190	d	other	SWest	67	3	6/22/98	97	7	31.8	2	18.2	0.0	0.0	1.0	2.9	47.4	91.9	26.8	73.2	71.1	41.7	4.8	77.1	42.1
Lewis Cr	LWS00388	LWS2895	v	str	SWest	67	3	4/30/01	96	11	50.0	4	36.4	20.8	34.0	0.0	0.0	62.5	100.0	7.3	92.7	57.3	61.7	4.4	82.5	57.2
Lewis Cr	LWS00388	LWS2907	v	str	SWest	67	3	10/18/01	95	9	40.9	4	36.4	16.8	27.5	0.0	0.0	86.3	100.0	1.1	98.9	75.8	35.0	4.2	85.5	53.0
Mechums R	MCM01892	MCM799	d	other	Valley	64	3	5/7/97	105	17	77.3	9	81.8	37.1	60.6	7.6	21.4	6.7	12.9	23.8	76.2	45.7	78.4	4.8	75.9	60.6
Muddy Cr	MDD00210	MUD698	d	other	Valley	67	3	10/22/96	133	17	77.3	6	54.5	8.3	13.5	1.5	4.2	12.8	24.8	19.5	80.5	50.4	71.7	5.6	64.7	48.9
Muddy Cr	MDD00210	MUD805	d	other	Valley	67	3	4/30/97	109	13	59.1	4	36.4	14.7	24.0	0.0	0.0	13.8	26.7	33.9	66.1	53.2	67.6	5.7	63.0	42.8
Muddy Cr	MDD00210	MDD1007	d	other	Valley	67	3	10/1/97	111	16	72.7	6	54.5	22.5	36.8	18.0	50.6	27.9	54.1	7.2	92.8	43.2	82.0	4.7	77.7	65.2
Muddy Cr	MDD00210	MDD1291	d	other	Valley	67	3	10/14/98	122	12	54.5	5	45.5	13.1	21.4	2.5	6.9	17.2	33.4	0.8	99.2	72.1	40.3	5.7	62.8	45.5
Muddy Cr	MDD00210	MDD002.1	v	str	Valley	67	3	5/26/99	144	14	63.6	5	45.5	5.6	9.1	0.7	1.9	31.3	60.6	27.1	72.9	53.5	67.2	5.3	69.1	48.7
Muddy Cr	MDD00210	MDD2738	v	str	Valley	67	3	10/28/99	133	11	50.0	4	36.4	0.0	0.0	3.0	8.4	30.1	58.3	42.9	57.1	68.4	45.6	5.6	64.5	40.1
Muddy Cr	MDD00210	MDD2794	v	str	Valley	67	3	4/24/00	388	12	54.5	2	18.2	0.0	0.0	0.5	1.4	13.4	26.0	12.9	87.1	72.7	39.5	6.0	58.4	35.7
Muddy Cr	MDD00210	MDD2850	v	str	Valley	67	3	10/24/00	133	14	63.6	2	18.2	0.0	0.0	4.5	12.7	13.5	26.2	20.3	79.7	60.2	57.6	5.8	61.9	40.0
Muddy Cr	MDD00581	MUD37	d	str	Valley	67	2	10/3/94	179	13	59.1	2	18.2	1.1	1.8	0.0	0.0	10.6	20.6	5.6	94.4	63.1	53.3	6.7	47.9	36.9
Muddy Cr	MDD00581	MUD248	d	other	Valley	67	2	5/16/95	129	17	77.3	4	36.4	18.6	30.4	3.1	8.7	11.6	22.5	31.0	69.0	34.9	94.1	5.8	62.3	50.1
Muddy Cr	MDD00581	MUD426	d	other	Valley	67	2	10/30/95	189	15	68.2	5	45.5	2.1	3.5	1.6	4.5	5.3	10.3	4.2	95.8	77.8	32.1	7.5	37.2	37.1
Muddy Cr	MDD00581	MUD561	d	other	Valley	67	2	5/23/96	135	13	59.1	5	45.5	19.3	31.4	1.5	4.2	11.9	23.0	20.7	79.3	35.6	93.1	6.1	57.5	49.1
Muddy Cr	MDD00581	MUD697	d	other	Valley	67	2	10/22/96	169	9	40.9	2	18.2	2.4	3.9	0.0	0.0	1.8	3.4	14.2	85.8	69.8	43.6	6.8	46.8	30.3
Muddy Cr	MDD00581	MUD804	d	str	Valley	67	2	4/30/97	124	14	63.6	5	45.5	12.1	19.7	1.6	4.5	3.2	6.3	34.7	65.3	56.5	62.9	5.8	62.5	41.3
Muddy Cr	MDD00581	MDD1006	d	str	Valley	67	2	9/23/97	129	13	59.1	3	27.3	5.4	8.9	3.1	8.7	7.0	13.5	10.9	89.1	52.7	68.3	6.9	46.0	40.1
Muddy Cr	MDD00581	MDD1305	d	str	Valley	67	2	10/14/98	157	12	54.5	5	45.5	12.7	20.8	0.0	0.0	28.0	54.3	3.2	96.8	75.2	35.9	5.4	67.0	46.9
Muddy Cr	MDD00581	MDD1404	v	str	Valley	67	2	5/26/99	274	17	77.3	6	54.5	3.3	5.4	0.4	1.0	36.1	70.0	26.3	73.7	59.5	58.5	5.7	63.7	50.5
Muddy Cr	MDD00581	MDD2739	v	str	Valley	67	2	10/28/99	137	10	45.5	1	9.1	0.7	1.2	0.0	0.0	19.0	36.8	40.1	59.9	69.3	44.3	6.3	54.7	31.4
Muddy Cr	MDD00581	MDD2795	v	str	Valley	67	2	4/24/00	437	12	54.5	0	0.0	0.0	0.0	0.0	0.0	8.7	16.9	31.4	68.6	78.3	31.4	6.1	56.7	28.5
Muddy Cr	MDD00581	MDD2851	v	str	Valley	67	2	10/24/00	126	19	86.4	6	54.5	3.2	5.2	8.7	24.5	26.2	50.8	11.9	88.1	31.0	99.7	6.0	59.0	58.5
Middle R	MDL00185	MDL85	d	other	Valley	67	4	10/25/94	120	18	81.8	7	63.6	34.2	55.8	3.3	9.4	45.8	88.8	6.7	93.3	37.5	90.3	4.6	79.1	70.3
Middle R	MDL00185	MDL244	d	other	Valley	67	4	5/1/95	110	19	86.4	8	72.7	17.3	28.2	4.5	12.8	44.5	86.3	8.2	91.8	41.8	84.0	4.8	76.9	67.4
Middle R	MDL00185	MDL421	d	other	Valley	67	4	10/3/95	122	18	81.8	7	63.6	36.1	58.9	4.1	11.5	41.8	81.0	3.3	96.7	34.4	94.7	4.3	83.1	71.4
Middle R	MDL03610	MDL71	d	other	Valley	67	3	10/20/94	151	19	86.4	7	63.6	11.9	19.5	7.3	20.4	63.6	100.0	5.3	94.7	56.3	63.1	4.2	85.0	66.6
Middle R	MDL03610	MDL245	d	other	Valley	67	3	5/1/95	142	18	81.8	9	81.8	14.8	24.1	16.9	47.4	54.9	100.0	4.2	95.8	44.4	80.4	4.1	87.3	74.8
Middle R	MDL03610	MDL420	d	other	Valley	67	3	10/11/95	144	18	81.8	9	81.8	11.8	19.3	20.1	56.5	43.8	84.8	2.1	97.9	39.6	87.3	4.4	82.3	74.0
Middle R	MDL06605	MDL6378	v	str	Valley	67	2	5/28/02	563	14	63.6	2	18.2	2.0	3.2	0.0	0.0	5.2	10.0	50.4	49.6	65.7	49.5	6.5	51.6	30.7
Middle R	MDL06647	MDL6379	v	str	Valley	67	2	5/28/02	489	13	59.1	3	27.3	0.4	0.7	0.0	0.0	4.1	7.9	22.7	77.3	57.1	62.0	6.8	46.8	35.1
Meadow Run	MDR00360	MDR1620	v	other	WCentral	66	2	4/18/01	131	10	45.5	3	27.3	13.0	21.2	0.0	0.0	9.9	19.2	61.8	38.2	77.9	32.0	5.6	64.4	31.0
Meadow Run	MDR00360	MDR1658	v	other	WCentral	66	2	11/1/01	119	13	59.1	7	63.6	37.8	61.7	4.2	11.8	35.3	68.4	17.6	82.4	56.3	63.1	4.9	75.0	60.6
Maggodee Cr	MEE00070	MEE1577	v	other	WCentral	45	3	10/5/00	178	15	68.2	5	45.5	25.8	42.2	0.0	0.0	5.6	10.9	0.6	99.4	57.3	61.7	4.8	76.6	50.6
Maggodee Cr	MEE00238	MEE19	d	other	WCentral	45	3	11/2/94	111	11	50.0	5	45.5	50.5	82.4	1.8	5.1	6.3	12.2	0.0	100.0	84.7	22.1	3.9	89.1	50.8
Maggodee Cr	MEE00238	MEE203	d	other	WCentral	45	3	5/17/95	102	13	59.1	9	81.8	52.0	84.8	4.9	13.8	8.8	17.1	1.0	99.0	52.9	68.0	4.4	83.0	63.3
Maggodee Cr	MEE00238	MEE395	d	other	WCentral	45	3	12/15/95	106	9	40.9	5	45.5	5.7	9.2	19.8	55.6	0.9	1.8	0.0	100.0	81.1	27.3	4.7	78.1	44.8
Maggodee Cr	MEE00238	MEE523	d	other	WCentral	45	3	5/29/96	97	10	45.5	5	45.5	38.1	62.3	1.0	2.9	0.0	0.0	0.0	100.0	67.0	47.7	4.7	77.7	47.7

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Maggodee Cr	MEE00238	MEE1427	v	other	WCentral	45	3	4/14/99	116	14	63.6	7	63.6	72.4	100.0	3.4	9.7	44.8	86.9	6.9	93.1	58.6	59.8	4.0	88.0	70.6
Maggodee Cr	MEE00238	MEE1496	v	other	WCentral	45	3	4/6/00	81	9	40.9	5	45.5	82.7	100.0	0.0	0.0	30.9	59.8	3.7	96.3	58.0	60.6	3.7	92.3	61.9
Meadow Cr	MEO00038	MEO539	d	other	WCentral	67	1	6/4/96	103	16	72.7	9	81.8	52.4	85.6	14.6	40.9	16.5	32.0	7.8	92.2	34.0	95.4	3.8	91.3	74.0
Meadow Cr	MEO00038	MEO755	d	other	WCentral	67	1	12/5/96	89	13	59.1	9	81.8	43.8	71.5	14.6	41.0	16.9	32.7	0.0	100.0	51.7	69.8	4.6	78.9	66.9
Meadow Cr	MEO00038	MEO848	d	other	WCentral	67	1	5/20/97	117	13	59.1	8	72.7	74.4	100.0	15.4	43.2	17.1	33.1	5.1	94.9	53.0	67.9	3.8	91.6	70.3
Meadow Cr	MEO00038	MEO104	d	other	WCentral	67	1	10/22/97	97	16	72.7	6	54.5	36.1	58.9	7.2	20.3	0.0	0.0	3.1	96.9	51.5	70.0	4.4	82.7	57.0
Meadow Cr	MEO00038	MEO1174	d	other	WCentral	67	1	6/3/98	113	17	77.3	9	81.8	56.6	92.5	23.0	64.6	12.4	24.0	2.7	97.3	44.2	80.5	3.7	92.7	76.4
Meadow Cr	MEO00038	MEO1361	d	other	WCentral	67	1	11/20/98	140	22	100.0	14	100.0	42.1	68.8	12.1	34.1	30.7	59.5	11.4	88.6	35.0	93.9	3.9	90.2	79.4
Meadow Cr	MEO00038	MEO	v	other	WCentral	67	1	6/2/99	116	18	81.8	9	81.8	50.0	81.6	12.1	33.9	27.6	53.5	3.4	96.6	39.7	87.2	3.7	92.0	76.0
Meadow Cr	MEO00038	MEO1455	v	other	WCentral	67	1	11/18/99	122	17	77.3	11	100.0	61.5	100.0	13.1	36.8	26.2	50.8	1.6	98.4	44.3	80.5	3.0	100.0	80.5
Meadow Cr	MEO00038	MEO1490	v	other	WCentral	67	1	5/1/00	110	21	95.5	14	100.0	65.5	100.0	12.7	35.7	22.7	44.0	0.0	100.0	38.2	89.3	3.1	100.0	83.1
Meadow Cr	MEO00038	MEO1586	v	other	WCentral	67	1	11/2/00	176	18	81.8	11	100.0	46.6	76.1	15.3	43.1	39.2	76.0	0.6	99.4	38.1	89.5	3.6	93.8	82.5
Moffett Cr	MFT00511	MFT2853	v	str	Valley	67	2	10/16/00	166	13	59.1	6	54.5	9.0	14.8	15.1	42.3	32.5	63.0	39.2	60.8	52.4	68.7	5.3	68.6	54.0
Moffett Cr	MFT00511	MFT2937	v	str	Valley	67	2	9/24/01	243	17	77.3	6	54.5	2.1	3.4	17.7	49.7	23.5	45.5	40.3	59.7	57.2	61.8	5.2	70.5	52.8
Moffett Cr	MFT00624	MFT43	d	other	Valley	67	2	10/20/94	160	18	81.8	6	54.5	8.8	14.3	29.4	82.5	15.0	29.1	12.5	87.5	55.0	65.0	4.8	76.7	61.4
Moffett Cr	MFT00624	MFT247	d	other	Valley	67	2	5/10/95	101	17	77.3	7	63.6	11.9	19.4	21.8	61.1	30.7	59.5	19.8	80.2	33.7	95.8	4.5	80.8	67.2
Moffett Cr	MFT00624	MFT424	d	other	Valley	67	2	10/10/95	104	7	31.8	1	9.1	0.0	0.0	0.0	0.0	75.0	100.0	0.0	100.0	72.1	40.3	5.3	69.1	43.8
Moffett Cr	MFT00624	MFT802	d	other	Valley	67	2	5/8/97	98	18	81.8	8	72.7	30.6	50.0	20.4	57.3	28.6	55.4	18.4	81.6	30.6	100.0	4.3	83.7	72.8
Moffett Cr	MFT00624	MFT980	d	str	Valley	67	2	10/14/97	106	13	59.1	6	54.5	1.9	3.1	39.6	100.0	6.6	12.8	9.4	90.6	66.0	49.1	5.0	74.0	55.4
Moffett Cr	MFT00624	MFT1312	d	str	Valley	67	2	10/6/98	144	12	54.5	4	36.4	9.0	14.7	26.4	74.1	18.1	35.0	43.1	56.9	66.0	49.2	5.0	73.7	49.3
Mill Cr	MIC00100	MIC94	d	other	Valley	67	2	10/25/94	98	21	95.5	5	45.5	5.1	8.3	2.0	5.7	30.6	59.3	11.2	88.8	31.6	98.8	5.6	64.8	58.3
Mill Cr	MIC00100	MIC246	d	other	Valley	67	2	5/16/95	125	13	59.1	4	36.4	7.2	11.8	0.8	2.2	54.4	100.0	24.0	76.0	53.6	67.0	4.8	76.1	53.6
Mill Cr	MIC00100	MIC423	d	other	Valley	67	2	10/3/95	114	12	54.5	1	9.1	0.9	1.4	0.0	0.0	67.5	100.0	8.8	91.2	67.5	46.9	4.8	76.2	47.4
Mill Cr	MIC00100	MIC559	d	other	Valley	67	2	4/22/96	118	8	36.4	0	0.0	0.0	0.0	0.0	0.0	2.5	4.9	48.3	51.7	80.5	28.2	6.4	53.1	21.8
Mill Cr	MIC00100	MIC695	d	other	Valley	67	2	10/24/96	110	14	63.6	5	45.5	4.5	7.4	0.9	2.6	18.2	35.2	25.5	74.5	48.2	74.8	6.1	58.0	45.2
Mill Cr	MIC00100	MIC800	d	other	Valley	67	2	5/6/97	125	16	72.7	5	45.5	14.4	23.5	0.8	2.2	16.8	32.6	15.2	84.8	51.2	70.5	5.4	68.1	50.0
Mill Cr	MIC00100	MIC1318	d	other	Valley	67	2	10/19/98	106	13	59.1	4	36.4	38.7	63.1	4.7	13.2	29.2	56.7	3.8	96.2	46.2	77.7	4.9	75.1	59.7
Mill Cr	MIC00100	MIC2854	v	str	Valley	67	2	10/24/00	334	13	59.1	2	18.2	0.6	1.0	0.0	0.0	14.1	27.3	23.1	76.9	65.0	50.6	6.0	58.1	36.4
Mill Cr	MIC00100	MIC2934	v	str	Valley	67	2	10/2/01	323	18	81.8	4	36.4	1.2	2.0	0.3	0.9	35.0	67.8	28.8	71.2	50.2	72.0	5.7	63.9	49.5
Mill Cr	MIC00100	MIC2972	v	str	Valley	67	2	4/29/02	156	11	50.0	2	18.2	0.6	1.0	0.0	0.0	71.8	100.0	6.4	93.6	71.2	41.7	4.7	77.4	47.7
Middle Cr	MID00020	MID494	d	other	SWest	67	3	5/21/96	28	9	40.9	6	54.5	25.0	40.8	17.9	50.1	46.4	90.0	10.7	89.3	50.0	72.2	3.8	90.8	66.1
Mill Cr	MIL00220	MIL422	d	other	Valley	67	2	10/25/95	123	24	100.0	10	90.9	22.0	35.8	26.8	75.3	29.3	56.7	3.3	96.7	44.7	79.9	4.6	79.0	76.8
Mill Cr	MIL00220	MIL560	d	other	Valley	67	2	5/21/96	147	12	54.5	6	54.5	24.5	40.0	0.0	0.0	6.1	11.9	59.2	40.8	65.3	50.1	5.5	66.7	39.8
Mill Cr	MIL00220	MIL694	d	other	Valley	67	2	10/15/96	100	17	77.3	6	54.5	31.0	50.6	3.0	8.4	17.0	32.9	32.0	68.0	43.0	82.3	5.1	71.4	55.7
Mill Cr	MIL00220	MIL801	d	other	Valley	67	2	5/27/97	126	17	77.3	8	72.7	20.6	33.7	4.0	11.1	15.1	29.2	34.9	65.1	54.8	65.3	5.2	70.6	53.1
Mill Cr	MIL00220	MIL979	d	other	Valley	67	2	9/23/97	115	19	86.4	6	54.5	13.9	22.7	18.3	51.3	7.8	15.2	8.7	91.3	52.2	69.1	4.7	78.5	58.6
Mill Cr	MIL00220	MIL1310	d	other	Valley	67	2	10/20/98	145	14	63.6	6	54.5	23.4	38.3	9.0	25.2	23.4	45.4	17.9	82.1	54.5	65.7	5.1	71.7	55.8
Mill Cr	MIL00220	MIL1413	v	other	Valley	67	2	5/18/99	165	20	90.9	10	90.9	40.6	66.3	6.1	17.0	20.6	39.9	22.4	77.6	57.0	62.2	4.8	77.0	65.2
Mill Cr	MIL00220	MIL2855	v	other	Valley	67	2	11/2/00	412	22	100.0	13	100.0	33.0	53.9	14.1	39.5	35.4	68.7	15.0	85.0	36.4	91.9	4.6	78.9	77.2
Mill Cr	MIL00220	MIL2935	v	other	Valley	67	2	9/27/01	312	19	86.4	10	90.9	21.5	35.1	17.3	48.6	13.1	25.5	28.8	71.2	55.4	64.4	5.0	74.1	62.0
Mill Cr	MIL00220	MIL2936	v	other	Valley	67	2	9/27/01	219	19	86.4	9	81.8	17.8	29.1	25.6	71.8	16.0	31.0	23.3	76.7	47.5	75.8	4.8	76.0	66.1
Mill Cr	MIL00220	MIL6389	v	other	Valley	67	2	5/14/02	273	19	86.4	9	81.8	42.5	69.4	2.6	7.2	12.5	24.1	33.0	67.0	51.3	70.4	5.0	74.1	60.1
Marl Cr	MRL00262	MRL2933	v	other	Valley	67	1	10/29/01	120	21	95.5	11	100.0	28.3	46.3	15.0	42.1	17.5	33.9	14.2	85.8	29.2	100.0	4.2	85.2	73.6
Maury R	MRY04364	MRY1419	v	other	Valley	67	4	5/6/99	103	16	72.7	7	63.6	33.0	53.9	2.9	8.2	16.5	32.0	19.4	80.6	42.7	82.7	5.3	68.9	57.8
Maury R	MRY04364	MRY2736	v	other	Valley	67	4	10/27/99	118	21	95.5	5	45.5	8.5	13.8	1.7	4.8	15.3	29.6	5.1	94.9	63.6	52.6	6.6	49.8	48.3
Maury R	MRY04364	MRY2796	v	other	Valley	67	4	5/9/00	168	20	90.9	7	63.6	23.8	38.9	1.2	3.3	14.3	27.7	37.5	62.5	47.6	75.7	5.5	65.5	53.5
Maury R	MRY04364	MRY2857	v	other	Valley	67	4	10/31/00	117	17	77.3	10	90.9	27.4	44.6	14.5	40.8	30.8	59.6	5.1	94.9	46.2	77.8	4.8	75.7	70.2
Maury R	MRY04364	MRY2938	v	other	Valley	67	4	10/29/01	97	13	59.1	6	54.5	38.1	62.3	5.2	14.5	51.5	99.9	0.0	100.0	62.9	53.6	4.5	80.6	65.6
Mossy Cr	MSS00301	MOS44	d	other	Valley	67	1	10/20/94	137	13	59.1	4	36.4	22.6	36.9	0.0	0.0	22.6	43.9	16.8	83.2	50.4	71.7	5.3	68.4	50.0

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Mossy Cr	MSS00301	MSS271	d	other	Valley	67	1	5/16/95	118	15	68.2	7	63.6	38.1	62.3	6.8	19.0	28.0	54.2	10.2	89.8	44.9	79.6	4.6	79.0	64.5
Mossy Cr	MSS00301	MSS425	d	other	Valley	67	1	10/10/95	102	17	77.3	7	63.6	15.7	25.6	6.9	19.3	37.3	72.2	7.8	92.2	33.3	96.3	5.0	73.2	65.0
Mossy Cr	MSS00301	MSS696	d	other	Valley	67	1	10/24/96	98	15	68.2	8	72.7	30.6	50.0	2.0	5.7	5.1	9.9	12.2	87.8	57.1	61.9	5.2	70.8	53.4
Mossy Cr	MSS00301	MSS803	d	other	Valley	67	1	5/8/97	107	11	50.0	6	54.5	38.3	62.5	4.7	13.1	1.9	3.6	18.7	81.3	48.6	74.2	4.9	74.3	51.7
Mossy Cr	MSS00301	MSS981	d	other	Valley	67	1	10/14/97	105	15	68.2	6	54.5	27.6	45.1	2.9	8.0	28.6	55.4	15.2	84.8	53.3	67.4	5.1	71.8	56.9
Mossy Cr	MSS00301	MSS1289	d	other	Valley	67	1	10/14/98	100	13	59.1	5	45.5	29.0	47.3	4.0	11.2	38.0	73.6	2.0	98.0	57.0	62.1	4.8	76.3	59.1
Mossy Cr	MSS00301	MSS1400	v	other	Valley	67	1	5/26/99	118	13	59.1	5	45.5	55.9	91.3	0.0	0.0	23.7	46.0	20.3	79.7	52.5	68.5	4.8	77.0	58.4
Mossy Cr	MSS00301	MSS2737	v	other	Valley	67	1	10/13/99	110	16	72.7	6	54.5	32.7	53.4	10.0	28.1	39.1	75.8	10.0	90.0	55.5	64.3	4.9	74.3	64.1
Mossy Cr	MSS00301	MSS2797	v	other	Valley	67	1	5/3/00	125	18	81.8	10	90.9	40.0	65.3	6.4	18.0	21.6	41.9	13.6	86.4	39.2	87.8	4.8	77.0	68.6
Mossy Cr	MSS00301	MSS2858	v	other	Valley	67	1	10/13/00	132	13	59.1	5	45.5	21.2	34.6	19.7	55.3	29.5	57.3	17.4	82.6	43.2	82.1	4.8	76.5	61.6
Matta R	MTA01209	MTA3038	v	other	Northern	45	4	5/28/02	100	11	50.0	7	63.6	11.0	18.0	26.0	73.0	6.0	11.6	1.0	99.0	71.0	41.9	4.8	76.4	54.2
Mountain Run	MTN00059	MTN171	d	other	Northern	45	3	9/15/94	111	17	77.3	6	54.5	29.7	48.5	0.9	2.5	45.9	89.0	3.6	96.4	35.1	93.7	4.4	82.9	68.1
Mountain Run	MTN00059	MTN188	d	other	Northern	45	3	10/3/94	324	19	86.4	6	54.5	5.6	9.1	32.7	91.8	5.6	10.8	2.2	97.8	58.0	60.6	3.3	98.6	63.7
Mountain Run	MTN00059	MTN349	d	other	Northern	45	3	5/19/95	89	16	72.7	3	27.3	10.1	16.5	0.0	0.0	31.5	61.0	3.4	96.6	34.8	94.1	5.1	71.3	55.0
Mountain Run	MTN00059	MTN454	d	other	Northern	45	3	9/11/95	108	17	77.3	4	36.4	32.4	52.9	0.0	0.0	38.9	75.4	2.8	97.2	40.7	85.6	4.9	75.0	62.5
Mountain Run	MTN00059	MTN594	d	other	Northern	45	3	5/10/96	105	15	68.2	5	45.5	36.2	59.1	0.0	0.0	56.2	100.0	2.9	97.1	46.7	77.0	4.7	77.3	65.5
Mountain Run	MTN00059	MTN661	d	other	Northern	45	3	10/29/96	111	17	77.3	4	36.4	16.2	26.5	0.0	0.0	30.6	59.4	3.6	96.4	30.6	100.0	5.2	70.0	58.2
Mountain Run	MTN00059	MTN904	d	other	Northern	45	3	3/10/97	155	13	59.1	3	27.3	20.0	32.6	0.0	0.0	25.8	50.0	3.2	96.8	62.6	54.0	5.4	68.0	48.5
Mountain Run	MTN00059	MTN936	d	other	Northern	45	3	10/2/97	151	28	100.0	9	81.8	22.5	36.8	14.6	40.9	25.8	50.1	0.7	99.3	27.2	100.0	4.4	81.8	73.8
Mountain Run	MTN00059	MTN1220	d	other	Northern	45	3	4/2/98	144	19	86.4	6	54.5	27.1	44.2	1.4	3.9	46.5	90.2	5.6	94.4	40.3	86.3	4.8	75.7	67.0
Mountain Run	MTN00059	MTN1266	d	other	Northern	45	3	10/20/98	173	20	90.9	5	45.5	32.9	53.8	1.2	3.2	29.5	57.1	3.5	96.5	42.8	82.7	4.7	77.4	63.4
Mountain Run	MTN00059	MTN1410	v	other	Northern	64	3	4/6/99	140	17	77.3	5	45.5	27.1	44.3	6.4	18.0	46.4	90.0	0.0	100.0	35.7	92.9	4.5	80.8	68.6
Mountain Run	MTN00059	MTN1419	v	other	Northern	64	3	10/13/99	167	21	95.5	6	54.5	22.2	36.2	4.2	11.8	44.9	87.0	2.4	97.6	29.9	100.0	4.4	82.5	70.6
Mountain Run	MTN00059	MTN2779	v	other	Northern	64	3	3/16/00	185	20	90.9	5	45.5	29.2	47.6	0.0	0.0	38.4	74.4	4.9	95.1	27.0	100.0	4.7	77.3	66.4
Mountain Run	MTN00059	MTN2974	v	other	Northern	64	3	5/31/01	107	16	72.7	7	63.6	12.1	19.8	0.0	0.0	49.5	96.0	0.9	99.1	44.9	79.6	3.8	90.5	65.2
Mountain Run	MTN00059	MTN3001	v	other	Northern	64	3	10/17/01	96	12	54.5	4	36.4	37.5	61.2	5.2	14.6	28.1	54.5	0.0	100.0	41.7	84.3	4.1	86.8	61.5
Mountain Run	MTN00059	MTN3018	v	other	Northern	64	3	4/3/02	99	12	54.5	6	54.5	46.5	75.8	3.0	8.5	52.5	100.0	0.0	100.0	52.5	68.6	4.5	81.2	67.9
Martin Cr	MTN00356	MAR297	d	other	SWest	67	4	4/19/95	99	16	72.7	7	63.6	28.3	46.2	6.1	17.0	26.3	50.9	23.2	76.8	39.4	87.5	4.6	79.7	61.8
Martin Cr	MTN00356	MTN359	d	other	SWest	67	4	10/17/95	180	15	68.2	7	63.6	55.0	89.8	6.7	18.7	50.0	96.9	0.6	99.4	45.6	78.6	3.8	90.7	75.8
Martin Cr	MTN00356	MTN767	d	other	SWest	67	4	4/15/97	117	16	72.7	8	72.7	36.8	60.0	10.3	28.8	27.4	53.0	22.2	77.8	41.9	84.0	4.5	81.5	66.3
Martin Cr	MTN00356	MTN1090	d	other	SWest	67	4	12/17/97	95	14	63.6	7	63.6	55.8	91.1	3.2	8.9	51.6	100.0	5.3	94.7	47.4	76.0	4.2	85.7	73.0
Martin Cr	MTN00356	MTN1200	d	other	SWest	67	4	6/18/98	130	15	68.2	8	72.7	22.3	36.4	10.0	28.1	16.9	32.8	11.5	88.5	34.6	94.4	4.8	77.1	62.3
Naked Cr	NAK00124	NAK427	d	other	Valley	67	2	10/12/95	132	21	95.5	8	72.7	16.7	27.2	4.5	12.8	13.6	26.4	1.5	98.5	63.6	52.5	5.0	72.8	57.3
Naked Cr	NAK00124	NAK562	d	other	Valley	67	2	4/22/96	98	13	59.1	9	81.8	45.9	75.0	10.2	28.6	13.3	25.7	28.6	71.4	52.0	69.3	4.4	82.0	61.6
N F Shenandoa	NFS09451	NFS66	d	other	Valley	67	3	10/5/94	161	21	95.5	9	81.8	34.2	55.8	12.4	34.9	28.6	55.4	7.5	92.5	34.8	94.2	4.0	88.5	74.8
N F Shenandoa	NFS09451	NFS249	d	other	Valley	67	3	5/22/95	110	20	90.9	12	100.0	28.2	46.0	10.0	28.1	11.8	22.9	18.2	81.8	48.2	74.8	4.7	77.6	65.3
North Otter Cre	NOC00422	NOC1430	v	other	WCentral	45		6/7/99	123	15	68.2	8	72.7	28.5	46.4	19.5	54.8	11.4	22.1	8.1	91.9	37.4	90.4	4.1	86.9	66.7
North Cr	NOR00020	NOR2761	v	other	Valley	45	2	10/21/99	98	11	50.0	6	54.5	5.1	8.3	0.0	0.0	4.1	7.9	72.4	27.6	85.7	20.6	5.2	71.1	30.0
North Cr	NOR00328	NOR1386	v	other	Valley	45	1	6/2/99	119	16	72.7	6	54.5	5.9	9.6	7.6	21.2	5.0	9.8	68.1	31.9	73.9	37.6	5.2	69.9	38.4
North Cr	NOR00328	NOR2762	v	other	Valley	45	1	10/21/99	150	11	50.0	2	18.2	0.0	0.0	0.7	1.9	0.7	1.3	26.7	73.3	47.3	76.1	7.4	38.2	32.4
North Cr	NOR00328	NOR2799	v	other	Valley	45	1	5/10/00	377	14	63.6	3	27.3	0.0	0.0	0.0	0.0	1.3	2.6	35.8	64.2	74.0	37.5	7.1	43.1	29.8
North Cr	NOR00328	NOR2859	v	other	Valley	45	1	10/26/00	214	14	63.6	1	9.1	0.0	0.0	0.0	0.0	0.5	0.9	6.1	93.9	61.7	55.3	7.8	32.4	31.9
North Cr	NOR00328	NOR2939	v	other	Valley	45	1	9/28/01	188	16	72.7	3	27.3	1.1	1.7	0.0	0.0	3.7	7.2	6.9	93.1	55.3	64.5	7.6	34.9	37.7
North Cr	NOR00359	NOR1383	v	other	Valley	45	1	6/2/99	833	16	72.7	1	9.1	0.0	0.0	0.0	0.0	3.5	6.7	31.2	68.8	65.9	49.2	7.2	41.3	31.0
North Cr	NOR00359	NOR2763	v	other	Valley	45	1	10/21/99	103	15	68.2	6	54.5	4.9	7.9	9.7	27.3	12.6	24.5	42.7	57.3	50.5	71.5	4.9	74.5	48.2
North Cr	NOR00359	NOR2800	v	other	Valley	45	1	5/10/00	119	19	86.4	10	90.9	13.4	21.9	9.2	25.9	4.2	8.1	63.9	36.1	70.6	42.5	5.2	70.5	47.8
North Cr	NOR00359	NOR2860	v	other	Valley	45	1	10/26/00	125	10	45.5	5	45.5	9.6	15.7	0.0	0.0	8.8	17.1	74.4	25.6	81.6	26.6	5.4	67.4	30.4
North Cr	NOR00359	NOR2940	v	other	Valley	45	1	9/28/01	124	14	63.6	6	54.5	34.7	56.6	2.4	6.8	48.4	93.8	33.9	66.1	66.9	47.8	4.9	74.8	58.0
North R	NTH04675	NTH51	d	other	Valley	67	2	11/3/94	107	19	86.4	10	90.9	43.0	70.2	26.2	73.5	23.4	45.3	5.6	94.4	40.2	86.4	3.6	94.8	80.2

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
North R	NTH04675	NTH428	d	other	Valley	67	2	10/23/95	107	14	63.6	7	63.6	50.5	82.4	27.1	76.1	24.3	47.1	6.5	93.5	44.9	79.6	3.3	98.2	75.5
Ogle Run	OGL00432	OGL540	d	other	WCentral	67	2	6/4/96	84	6	27.3	4	36.4	90.5	100.0	2.4	6.7	11.9	23.1	0.0	100.0	85.7	20.6	4.0	88.9	50.4
Opequon Cr	OPE02961	OPE67	d	other	Valley	67	3	10/19/94	106	13	59.1	6	54.5	27.4	44.7	0.0	0.0	34.0	65.8	7.5	92.5	51.9	69.5	4.9	74.4	57.6
Opequon Cr	OPE02961	OPE255	d	other	Valley	67	3	5/3/95	152	15	68.2	6	54.5	39.5	64.4	5.3	14.8	16.4	31.9	25.0	75.0	50.7	71.3	4.8	76.1	57.0
Opequon Cr	OPE02961	OPE1313	d	other	Valley	67	3	10/9/98	119	14	63.6	5	45.5	16.0	26.1	0.8	2.4	33.6	65.1	2.5	97.5	67.2	47.3	5.2	70.1	52.2
Opequon Cr	OPE02961	OPE1415	v	other	Valley	67	3	5/10/99	104	17	77.3	6	54.5	24.0	39.2	0.0	0.0	23.1	44.7	43.3	56.7	58.7	59.7	5.1	71.9	50.5
Opequon Cr	OPE02961	OPE2741	v	other	Valley	67	3	10/20/99	106	12	54.5	3	27.3	13.2	21.6	0.0	0.0	89.6	100.0	0.9	99.1	77.4	32.7	4.2	85.4	52.6
Opequon Cr	OPE02961	OPE2802	v	other	Valley	67	3	4/12/00	146	9	40.9	3	27.3	7.5	12.3	0.0	0.0	8.9	17.3	54.8	45.2	76.0	34.6	6.2	56.6	29.3
Opequon Cr	OPE02961	OPE2861	v	other	Valley	67	3	10/17/00	112	12	54.5	4	36.4	8.9	14.6	0.0	0.0	51.8	100.0	16.1	83.9	58.9	59.3	4.9	75.0	53.0
Opequon Cr	OPE02961	OPE2943	v	other	Valley	67	3	10/10/01	142	12	54.5	6	54.5	12.7	20.7	0.0	0.0	35.9	69.6	31.0	69.0	64.8	50.9	5.1	72.0	48.9
Opequon Cr	OPE02961	OPE2944	v	other	Valley	67	3	10/10/01	184	11	50.0	5	45.5	12.5	20.4	0.0	0.0	42.4	82.2	17.4	82.6	63.6	52.6	5.0	73.2	50.8
Opequon Cr	OPE02961	OPE2978	v	other	Valley	67	3	5/28/02	133	11	50.0	5	45.5	21.8	35.6	0.0	0.0	36.8	71.4	36.1	63.9	63.2	53.2	5.1	72.5	49.0
Opequon Cr	OPE03453	OPE45	d	other	Valley	67	2	10/19/94	137	17	77.3	5	45.5	16.1	26.2	1.5	4.1	43.8	84.9	10.2	89.8	35.0	93.8	5.0	73.3	61.9
Opequon Cr	OPE03613	OPE2977	v	other	Valley	67	3	5/28/02	154	16	72.7	7	63.6	9.1	14.8	1.3	3.6	36.4	70.5	35.1	64.9	67.5	46.9	5.2	70.7	51.0
Old Womans Cı	OWC00437	OWC1603	v	other	WCentral	45	3	5/15/01	108	16	72.7	8	72.7	15.7	25.7	0.0	0.0	18.5	35.9	33.3	66.7	54.6	65.5	4.0	87.5	53.3
Old Womans Cı	OWC00437	OWC1663	v	other	WCentral	45	3	11/7/01	103	20	90.9	12	100.0	26.2	42.8	13.6	38.2	34.0	65.9	9.7	90.3	35.0	94.0	4.3	84.0	75.8
Old Womans Cı	OWC00461	OWC1604	v	other	WCentral	45	3	4/10/01	90	10	45.5	5	45.5	30.0	49.0	0.0	0.0	6.7	12.9	34.4	65.6	57.8	61.0	4.8	76.6	44.5
Old Womans Cı	OWC00536	OWC1607	v	other	WCentral	45	2	2/14/01	180	18	81.8	11	100.0	9.4	15.4	23.9	67.1	7.2	14.0	17.8	82.2	42.8	82.7	4.6	79.0	65.3
Poplar Br	PAA00024	PAA1608	v	other	WCentral	45	2	5/31/01	114	14	63.6	7	63.6	15.8	25.8	23.7	66.5	16.7	32.3	46.5	53.5	64.9	50.7	4.8	76.2	54.0
Poplar Br	PAA00024	PAA1644	v	other	WCentral	45	2	10/17/01	99	15	68.2	7	63.6	37.4	61.0	7.1	19.8	9.1	17.6	25.3	74.7	57.6	61.3	4.7	77.9	55.5
Paine Run	PAN00270	PAN52	d	other	Valley	66	2	10/26/94	137	17	77.3	9	81.8	9.5	15.5	38.7	100.0	12.4	24.0	7.3	92.7	43.1	82.2	3.5	95.0	71.1
Paine Run	PAN00270	PAN256	d	other	Valley	66	2	5/30/95	102	16	72.7	9	81.8	26.5	43.2	35.3	99.1	4.9	9.5	11.8	88.2	25.5	100.0	3.3	99.1	74.2
Paine Run	PAN00270	PAN434	d	other	Valley	66	2	10/24/95	113	16	72.7	10	90.9	23.9	39.0	27.4	77.0	16.8	32.6	4.4	95.6	39.8	86.9	3.9	89.3	73.0
Paine Run	PAN00270	PAN990	d	other	Valley	66	2	10/9/97	128	16	72.7	6	54.5	25.8	42.1	21.1	59.2	32.0	62.1	7.0	93.0	43.0	82.4	4.0	87.6	69.2
Paine Run	PAN00270	PAN2945	v	other	Valley	66	2	10/4/01	110	19	86.4	11	100.0	21.8	35.6	21.8	61.2	25.5	49.3	21.8	78.2	40.9	85.4	3.9	89.6	73.2
Pigg R	PGG07368	PGG1530	v	other	WCentral	45	3	8/8/00	252	19	86.4	8	72.7	21.0	34.3	2.4	6.7	35.7	69.2	2.0	98.0	44.0	80.8	4.3	84.0	66.5
Pigg R	PGG07368	PGG1622	v	other	WCentral	45	3	3/27/01	160	14	63.6	6	54.5	53.1	86.7	0.0	0.0	8.1	15.7	10.0	90.0	66.9	47.8	4.7	77.7	54.5
Pughs Run	PGH00060	PGH438	d	other	Valley	67	2	10/25/95	120	24	100.0	10	90.9	40.8	66.7	3.3	9.4	52.5	100.0	2.5	97.5	51.7	69.8	4.8	76.7	76.4
Pughs Run	PGH00060	PGH569	d	other	Valley	67	2	6/5/96	105	19	86.4	10	90.9	24.8	40.4	19.0	53.5	14.3	27.7	18.1	81.9	35.2	93.5	4.4	81.6	69.5
Pughs Run	PGH00060	PGH989	d	other	Valley	67	2	10/16/97	130	19	86.4	8	72.7	30.0	49.0	16.2	45.3	16.9	32.8	2.3	97.7	40.8	85.6	4.7	77.4	68.4
Peak Cr	PKC00780	PKC28	d	other	WCentral	67	4	10/7/94	97	7	31.8	2	18.2	1.0	1.7	0.0	0.0	2.1	4.0	0.0	100.0	90.7	13.4	5.7	63.6	29.1
Peak Cr	PKC00780	PKC214	d	other	WCentral	67	4	5/3/95	118	5	22.7	1	9.1	0.0	0.0	0.0	0.0	10.2	19.7	0.0	100.0	93.2	9.8	5.8	62.1	27.9
Peak Cr	PKC00780	PKC378	d	str	WCentral	67	4	10/18/95	113	4	18.2	1	9.1	0.0	0.0	0.0	0.0	14.2	27.4	0.0	100.0	91.2	12.8	5.7	63.9	28.9
Peak Cr	PKC00780	PKC526	d	other	WCentral	67	4	5/1/96	79	13	59.1	6	54.5	15.2	24.8	11.4	32.0	17.7	34.3	21.5	78.5	48.1	75.0	4.7	77.6	54.5
Peak Cr	PKC00780	PKC748	d	str	WCentral	67	4	10/23/96	107	6	27.3	1	9.1	0.0	0.0	0.0	0.0	9.3	18.1	1.9	98.1	86.0	20.2	5.8	62.4	29.4
Peak Cr	PKC00780	PKC847	d	other	WCentral	67	4	5/1/97	82	14	63.6	5	45.5	1.2	2.0	25.6	71.9	20.7	40.2	8.5	91.5	34.1	95.1	4.6	79.4	61.1
Peak Cr	PKC00780	PKC1037	d	str	WCentral	67	4	10/9/97	100	4	18.2	1	9.1	0.0	0.0	0.0	0.0	17.0	32.9	0.0	100.0	83.0	24.6	5.3	69.4	31.8
Peak Cr	PKC00780	PKC1185	d	other	WCentral	67	4	4/6/98	92	13	59.1	5	45.5	4.3	7.1	4.3	12.2	21.7	42.1	22.8	77.2	42.4	83.2	5.1	72.0	49.8
Peak Cr	PKC00780	PKC1404	v	other	WCentral	67	4	3/1/99	110	7	31.8	1	9.1	0.0	0.0	0.0	0.0	10.9	21.1	31.8	68.2	74.5	36.8	5.6	64.4	28.9
Peak Cr	PKC00780	PKC1454	v	other	WCentral	67	4	11/3/99	109	10	45.5	1	9.1	0.0	0.0	0.0	0.0	14.7	28.4	0.0	100.0	78.0	31.8	5.8	61.1	34.5
Peak Cr	PKC00780	PKC1500	v	other	WCentral	67	4	3/28/00	111	8	36.4	1	9.1	0.0	0.0	0.0	0.0	32.4	62.9	25.2	74.8	55.9	63.8	5.8	62.0	38.6
Peak Cr	PKC00929	PKC26	d	other	WCentral	67	4	10/7/94	118	7	31.8	1	9.1	0.0	0.0	0.0	0.0	8.5	16.4	0.8	99.2	90.7	13.5	5.9	60.0	28.8
Peak Cr	PKC00929	PKC216	d	str	WCentral	67	4	5/3/95	104	10	45.5	3	27.3	1.0	1.6	1.0	2.7	24.0	46.6	10.6	89.4	62.5	54.2	5.9	60.6	41.0
Peak Cr	PKC00929	PKC376	d	str	WCentral	67	4	10/18/95	113	8	36.4	2	18.2	1.8	2.9	0.0	0.0	12.4	24.0	0.0	100.0	88.5	16.6	5.8	61.6	32.5
Peak Cr	PKC00929	PKC529	d	other	WCentral	67	4	5/1/96	90	16	72.7	8	72.7	17.8	29.0	7.8	21.8	26.7	51.7	12.2	87.8	45.6	78.6	4.8	76.7	61.4
Peak Cr	PKC00929	PKC747	d	str	WCentral	67	4	10/23/96	121	5	22.7	1	9.1	0.0	0.0	0.0	0.0	17.4	33.6	0.0	100.0	82.6	25.1	5.6	65.1	32.0
Peak Cr	PKC00929	PKC849	d	str	WCentral	67	4	5/1/97	101	13	59.1	5	45.5	8.9	14.5	10.9	30.6	29.7	57.6	18.8	81.2	39.6	87.2	4.8	76.4	56.5
Peak Cr	PKC00929	PKC1038	d	str	WCentral	67	4	10/9/97	97	10	45.5	3	27.3	0.0	0.0	3.1	8.7	23.7	46.0	3.1	96.9	75.3	35.7	5.4	68.3	41.0
Peak Cr	PKC00929	PKC1184	d	other	WCentral	67	4	4/6/98	104	14	63.6	7	63.6	8.7	14.1	1.9	5.4	26.0	50.3	22.1	77.9	58.7	59.7	5.3	69.8	50.6

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Peak Cr	PKC00929	PKC1403	v	other	WCentral	67	4	3/1/99	118	11	50.0	3	27.3	1.7	2.8	0.0	0.0	4.2	8.2	42.4	57.6	83.1	24.5	5.9	60.5	28.9
Peak Cr	PKC00929	PKC1453	v	other	WCentral	67	4	11/3/99	124	16	72.7	2	18.2	0.8	1.3	0.0	0.0	24.2	46.9	0.8	99.2	66.9	47.8	5.5	65.8	44.0
Peak Cr	PKC00929	PKC1501	v	other	WCentral	67	4	3/28/00	105	12	54.5	2	18.2	1.0	1.6	0.0	0.0	21.0	40.6	31.4	68.6	51.4	70.2	6.0	58.8	39.1
SF Powell	PLL00255	PLL506	d	other	SWest	69	4	4/18/96	109	8	36.4	2	18.2	10.1	16.5	0.0	0.0	26.6	51.6	60.6	39.4	80.7	27.8	5.2	70.0	32.5
SF Powell	PLL00255	PLL1102	d	other	SWest	69	4	11/20/97	142	14	63.6	5	45.5	26.1	42.5	0.7	2.0	37.3	72.3	10.6	89.4	52.1	69.2	4.2	84.8	58.7
Pleasant Run	PLR00008	PLE46	d	other	Valley	67	1	10/26/94	158	11	50.0	0	0.0	0.0	0.0	0.0	0.0	8.9	17.2	7.6	92.4	77.2	32.9	7.6	35.1	28.4
Pleasant Run	PLR00008	PLE258	d	other	Valley	67	1	5/26/95	148	11	50.0	1	9.1	0.7	1.1	0.0	0.0	13.5	26.2	12.2	87.8	57.4	61.5	7.7	34.1	33.7
Pleasant Run	PLR00008	PLE437	d	other	Valley	67	1	9/27/95	113	9	40.9	1	9.1	0.9	1.4	0.0	0.0	14.2	27.4	0.0	100.0	77.9	32.0	7.8	33.0	30.5
Pleasant Run	PLR00008	PLE567	d	str	Valley	67	1	6/3/96	120	10	45.5	0	0.0	0.0	0.0	0.0	0.0	1.7	3.2	12.5	87.5	69.2	44.5	6.9	45.7	28.3
Pleasant Run	PLR00008	PLE699	d	str	Valley	67	1	10/24/96	181	6	27.3	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	11.0	89.0	76.8	33.5	7.5	36.0	24.4
Pleasant Run	PLR00008	PLE807	d	str	Valley	67	1	4/30/97	132	7	31.8	0	0.0	0.0	0.0	0.0	0.0	1.5	2.9	34.1	65.9	68.2	46.0	7.0	44.8	23.9
Pleasant Run	PLR00008	PLR1008	d	other	Valley	67	1	9/17/97	416	9	40.9	1	9.1	0.0	0.0	0.0	0.0	1.4	2.8	0.0	100.0	96.9	4.5	7.9	30.2	23.4
Pleasant Run	PLR00008	PLR1308	d	str	Valley	67	1	10/6/98	169	4	18.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	98.8	1.7	8.0	29.8	18.7
Pleasant Run	PLR00008	PLR2745	v	str	Valley	67	1	10/28/99	126	10	45.5	0	0.0	0.0	0.0	0.0	0.0	32.5	63.1	7.9	92.1	66.7	48.1	7.4	37.7	35.8
Pleasant Run	PLR00008	PLR2803	v	str	Valley	67	1	5/17/00	247	9	40.9	0	0.0	0.0	0.0	0.0	0.0	2.0	3.9	8.1	91.9	79.4	29.8	7.7	34.1	25.1
Pleasant Run	PLR00008	PLR2862	v	str	Valley	67	1	10/24/00	247	5	22.7	0	0.0	0.0	0.0	0.0	0.0	2.0	3.9	0.0	100.0	97.6	3.5	7.9	30.8	20.1
Pounding Br	PNG00109	PNG808	d	other	Valley	64	1	5/7/97	109	18	81.8	10	90.9	53.2	86.9	9.2	25.8	13.8	26.7	16.5	83.5	45.0	79.5	4.3	83.0	69.8
Pounding Br	PNG00109	PNG987	d	other	Valley	64	1	9/29/97	129	16	72.7	6	54.5	58.9	96.2	2.3	6.5	48.8	94.6	2.3	97.7	56.6	62.7	4.0	88.1	71.6
NF Pound R	PNK00008	PNK128	d	other	SWest	69	3	10/5/94	98	10	45.5	4	36.4	55.1	89.9	4.1	11.5	45.9	89.0	0.0	100.0	65.3	50.1	4.2	85.2	63.4
NF Pound R	PNK00008	PNK502	d	other	SWest	69	3	4/17/96	93	7	31.8	5	45.5	14.0	22.8	52.7	100.0	5.4	10.4	31.2	68.8	81.7	26.4	3.6	94.5	50.0
NF Pound R	PNK00008	PNK1101	d	other	SWest	69	3	11/7/97	99	12	54.5	5	45.5	11.1	18.1	68.7	100.0	7.1	13.7	4.0	96.0	70.7	42.3	2.8	100.0	58.8
NF Pound R	PNK00008	PNK1211	d	other	SWest	69	3	6/8/98	37	7	31.8	3	27.3	24.3	39.7	0.0	0.0	5.4	10.5	48.6	51.4	62.2	54.7	5.6	64.3	35.0
SF Pound	PNS00040	PNS130	d	str	SWest	69	3	10/5/94	57	9	40.9	4	36.4	12.3	20.0	8.8	24.6	22.8	44.2	8.8	91.2	52.6	68.4	4.8	76.8	50.3
SF Pound	PNS00040	PNS503	d	other	SWest	69	3	4/17/96	58	5	22.7	2	18.2	0.0	0.0	3.4	9.7	8.6	16.7	34.5	65.5	82.8	24.9	5.7	63.3	27.6
SF Pound	PNS00040	PNS1100	d	str	SWest	69	3	11/7/97	113	9	40.9	4	36.4	0.0	0.0	56.6	100.0	8.8	17.2	7.1	92.9	71.7	40.9	3.5	95.2	52.9
SF Pound	PNS00040	PNS1210	d	str	SWest	69	3	6/8/98	92	6	27.3	2	18.2	0.0	0.0	1.1	3.1	20.7	40.0	29.3	70.7	73.9	37.7	5.6	65.0	32.7
SF Pound	PNS00394	PNS2894	v	str	SWest	69	4	6/18/01	96	6	27.3	1	9.1	0.0	0.0	0.0	0.0	47.9	92.9	24.0	76.0	71.9	40.6	4.9	74.4	40.0
SF Pound	PNS00394	PNS2903	v	str	SWest	69	4	10/29/01	96	5	22.7	1	9.1	0.0	0.0	0.0	0.0	66.7	100.0	1.0	99.0	93.8	9.0	4.5	80.2	40.0
Piney R	PNY00530	PNY90	d	other	Valley	45	4	10/27/94	119	23	100.0	11	100.0	39.5	64.5	19.3	54.3	19.3	37.5	5.0	95.0	35.3	93.5	4.2	85.9	78.8
Piney R	PNY00530	PNY568	d	other	Valley	45	4	5/22/96	129	25	100.0	12	100.0	36.4	59.5	24.8	69.6	14.7	28.5	15.5	84.5	27.9	100.0	3.9	90.3	79.1
Piney R	PNY00530	PNY988	d	other	Valley	45	4	10/20/97	116	20	90.9	10	90.9	31.0	50.7	35.3	99.2	18.1	35.1	5.2	94.8	31.0	99.6	3.9	89.3	81.3
Piney R	PNY00530	PNY1320	d	other	Valley	45	4	10/13/98	142	17	77.3	9	81.8	43.0	70.1	14.1	39.5	47.2	91.4	4.9	95.1	52.8	68.2	4.2	85.4	76.1
Piney R	PNY00530	PNY1398	v	other	Valley	45	4	5/12/99	115	18	81.8	10	90.9	52.2	85.2	10.4	29.3	47.0	91.0	15.7	84.3	47.8	75.4	4.3	84.3	77.8
Piney R	PNY00530	PNY2744	v	other	Valley	45	4	10/25/99	102	16	72.7	9	81.8	52.0	84.8	14.7	41.3	46.1	89.3	5.9	94.1	52.0	69.4	4.1	86.2	77.5
Piney R	PNY00530	PNY2804	v	other	Valley	45	4	4/20/00	109	16	72.7	8	72.7	77.1	100.0	3.7	10.3	35.8	69.3	6.4	93.6	68.8	45.1	4.1	86.1	68.7
Piney R	PNY00530	PNY2863	v	other	Valley	45	4	10/19/00	137	16	72.7	8	72.7	40.9	66.7	12.4	34.8	22.6	43.9	9.5	90.5	44.5	80.1	4.5	80.1	67.7
Piney R	PNY00530	PNY2946	v	other	Valley	45	4	9/26/01	136	14	63.6	8	72.7	39.7	64.8	5.1	14.4	35.3	68.4	35.3	64.7	64.7	51.0	4.9	74.9	59.3
Piney R	PNY00530	PNY6390	v	other	Valley	45	4	5/29/02	204	17	77.3	9	81.8	46.1	75.2	10.3	28.9	22.5	43.7	15.2	84.8	42.6	82.8	4.2	85.1	70.0
Piney R	PNY00815	PNY1505	v	other	WCentral	45		3/20/00	120	15	68.2	10	90.9	44.2	72.1	35.8	100.0	20.8	40.4	7.5	92.5	49.2	73.4	3.2	99.6	79.6
Popes Head Cr	POE00200	POE917	d	other	Northern	45	3	4/15/97	62	8	36.4	4	36.4	30.6	50.0	0.0	0.0	14.5	28.1	1.6	98.4	54.8	65.2	4.8	76.8	48.9
Popes Head Cr	POE00200	POE950	d	other	Northern	45	3	10/29/97	61	12	54.5	4	36.4	41.0	66.9	0.0	0.0	14.8	28.6	1.6	98.4	41.0	85.2	4.2	84.6	56.8
Popes Head Cr	POE00200	POE1230	d	other	Northern	45	3	7/15/98	89	17	77.3	2	18.2	12.4	20.2	0.0	0.0	19.1	37.0	3.4	96.6	40.4	86.0	5.4	67.9	50.4
Popes Head Cr	POE00200	POE1276	d	other	Northern	45	3	12/7/98	78	13	59.1	4	36.4	37.2	60.7	0.0	0.0	21.8	42.2	5.1	94.9	39.7	87.0	4.7	77.8	57.3
Popes Head Cr	POE00200	POE1404	v	other	Northern	45	3	6/7/99	76	15	68.2	5	45.5	27.6	45.1	0.0	0.0	22.4	43.3	1.3	98.7	30.3	100.0	4.9	74.8	59.5
Popes Head Cr	POE00200	POE1427	v	other	Northern	45	3	9/30/99	71	16	72.7	3	27.3	14.1	23.0	0.0	0.0	12.7	24.6	5.6	94.4	40.8	85.4	5.8	62.1	48.7
Popes Head Cr	POE00200	POE2770	v	other	Northern	45	3	5/23/00	82	12	54.5	2	18.2	1.2	2.0	0.0	0.0	1.2	2.4	3.7	96.3	74.4	37.0	5.9	59.7	33.8
Passage Cr	PSG00020	PSG68	d	other	Valley	67	3	10/19/94	100	19	86.4	8	72.7	19.0	31.0	26.0	73.0	32.0	62.0	2.0	98.0	33.0	96.8	4.1	87.4	75.9
Passage Cr	PSG00020	PSG436	d	other	Valley	67	3	10/16/95	106	19	86.4	9	81.8	25.5	41.6	19.8	55.6	41.5	80.4	2.8	97.2	31.1	99.5	4.0	88.0	78.8
Passage Cr	PSG00020	PSG2864	v	other	Valley	67	3	10/23/00	116	13	59.1	7	63.6	14.7	23.9	5.2	14.5	81.9	100.0	0.9	99.1	69.8	43.6	4.1	87.0	61.4

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Passage Cr	PSG00020	PSG2947	v	other	Valley	67	3	10/30/01	105	15	68.2	7	63.6	33.3	54.4	18.1	50.8	51.4	99.7	3.8	96.2	36.2	92.2	3.8	90.8	77.0
Passage Cr	PSG00020	PSG6387	v	other	Valley	67	3	5/14/02	116	16	72.7	8	72.7	19.0	31.0	8.6	24.2	42.2	81.9	21.6	78.4	50.0	72.2	4.6	79.8	64.1
Quail Run	QAL00447	QAL702	d	other	Valley	67	1	10/31/96	130	16	72.7	6	54.5	4.6	7.5	2.3	6.5	4.6	8.9	29.2	70.8	63.1	53.3	6.1	57.8	41.5
Quail Run	QAL00447	QAL811	d	other	Valley	67	1	5/6/97	124	7	31.8	1	9.1	0.0	0.0	0.8	2.3	4.8	9.4	83.9	16.1	90.3	14.0	5.9	60.1	17.8
Quail Run	QAL00447	QAL1282	d	other	Valley	67	1	10/19/98	107	10	45.5	3	27.3	4.7	7.6	0.0	0.0	7.5	14.5	12.1	87.9	69.2	44.5	6.1	58.0	35.7
Quail Run	QAL00447	QAL1393	v	other	Valley	67	1	6/1/99	149	10	45.5	3	27.3	3.4	5.5	0.0	0.0	13.4	26.0	26.2	73.8	73.2	38.8	5.7	63.1	35.0
Quail Run	QAL00447	QAL2746	v	other	Valley	67	1	10/19/99	103	14	63.6	2	18.2	1.0	1.6	0.0	0.0	48.5	94.1	7.8	92.2	56.3	63.1	5.0	73.5	50.8
Quail Run	QAL00447	QAL2807	v	other	Valley	67	1	5/11/00	603	4	18.2	0	0.0	0.0	0.0	0.0	0.0	4.0	7.7	19.7	80.3	92.0	11.5	6.0	58.8	22.1
Quail Run	QAL00447	QAL2867	v	other	Valley	67	1	10/20/00	109	9	40.9	1	9.1	0.0	0.0	0.0	0.0	42.2	81.8	2.8	97.2	61.5	55.7	5.6	64.4	43.6
Quail Run	QAL00447	QAL2949	v	other	Valley	67	1	10/2/01	124	13	59.1	1	9.1	1.6	2.6	0.0	0.0	26.6	51.6	20.2	79.8	46.8	76.9	5.6	65.2	43.0
Quail Run	QAL00447	QAL2980	v	other	Valley	67	1	5/24/02	944	9	40.9	1	9.1	0.8	1.4	0.0	0.0	1.0	1.8	3.6	96.4	97.0	4.3	6.0	59.0	26.6
Quail Run	QAL00513	QAL701	d	other	Valley	67	1	10/31/96	100	8	36.4	1	9.1	0.0	0.0	0.0	0.0	2.0	3.9	22.0	78.0	72.0	40.4	8.0	29.2	24.6
Quail Run	QAL00513	QAL810	d	other	Valley	67	1	5/6/97	132	4	18.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	84.8	15.2	86.4	19.7	6.9	45.6	12.3
Quail Run	QAL00513	QAL1284	d	other	Valley	67	1	10/19/98	96	9	40.9	1	9.1	1.0	1.7	0.0	0.0	36.5	70.7	7.3	92.7	78.1	31.6	5.9	60.9	38.5
Quail Run	QAL00513	QAL1389	v	other	Valley	67	1	6/1/99	458	8	36.4	1	9.1	0.0	0.0	0.0	0.0	0.2	0.4	14.6	85.4	98.7	1.9	6.0	58.6	24.0
Quail Run	QAL00513	QAL2747	v	other	Valley	67	1	10/19/99	101	10	45.5	0	0.0	0.0	0.0	0.0	0.0	24.8	48.0	8.9	91.1	70.3	42.9	5.8	61.8	36.2
Quail Run	QAL00513	QAL2808	v	other	Valley	67	1	5/11/00	405	5	22.7	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6	85.4	88.6	16.4	6.3	54.9	22.4
Quail Run	QAL00513	QAL2868	v	other	Valley	67	1	10/20/00	166	4	18.2	0	0.0	0.0	0.0	0.0	0.0	2.4	4.7	30.7	69.3	75.9	34.8	7.3	39.8	20.8
Quail Run	QAL00518	QAL700	d	other	Valley	67	1	10/31/96	117	12	54.5	6	54.5	3.4	5.6	17.9	50.4	2.6	5.0	15.4	84.6	53.0	67.9	5.1	71.8	49.3
Quail Run	QAL00518	QAL809	d	other	Valley	67	1	5/6/97	99	13	59.1	9	81.8	8.1	13.2	33.3	93.6	0.0	0.0	43.4	56.6	54.5	65.7	4.4	82.1	56.5
Quail Run	QAL00518	QAL1283	d	other	Valley	67	1	10/19/98	131	15	68.2	6	54.5	3.1	5.0	17.6	49.3	14.5	28.1	20.6	79.4	48.1	75.0	4.6	80.0	54.9
Quail Run	QAL00518	QAL1402	v	other	Valley	67	1	6/1/99	155	16	72.7	8	72.7	4.5	7.4	10.3	29.0	6.5	12.5	67.1	32.9	71.6	41.0	5.1	72.2	42.6
Quail Run	QAL00518	QAL2748	v	other	Valley	67	1	10/19/99	111	14	63.6	4	36.4	1.8	2.9	16.2	45.5	9.9	19.2	45.0	55.0	55.9	63.8	4.6	79.3	45.7
Quail Run	QAL00518	QAL2809	v	other	Valley	67	1	5/11/00	176	11	50.0	8	72.7	2.3	3.7	17.0	47.8	3.4	6.6	54.0	46.0	79.0	30.4	5.3	69.0	40.8
Quail Run	QAL00518	QAL2869	v	other	Valley	67	1	10/20/00	118	15	68.2	5	45.5	0.0	0.0	20.3	57.1	5.1	9.9	17.8	82.2	43.2	82.0	5.1	72.5	52.2
Quail Run	QAL00518	QAL2950	v	other	Valley	67	1	10/2/01	109	14	63.6	2	18.2	0.0	0.0	5.5	15.5	7.3	14.2	6.4	93.6	46.8	76.9	4.4	82.0	45.5
Rapidan R	RAP08243	RAP172	d	other	Northern	66	2	9/21/94	111	22	100.0	11	100.0	22.5	36.8	48.6	100.0	18.9	36.7	0.9	99.1	33.3	96.3	2.4	100.0	83.6
Rapidan R	RAP08243	RAP345	d	other	Northern	66	2	5/16/95	110	17	77.3	12	100.0	30.9	50.5	45.5	100.0	32.7	63.4	0.9	99.1	28.2	100.0	2.0	100.0	86.3
Rapidan R	RAP08243	RAP453	d	other	Northern	66	2	10/20/95	31	12	54.5	5	45.5	12.9	21.1	19.4	54.3	12.9	25.0	3.2	96.8	35.5	93.2	4.1	87.2	59.7
Rapidan R	RAP08243	RAP593	d	other	Northern	66	2	5/24/96	108	17	77.3	13	100.0	40.7	66.5	41.7	100.0	19.4	37.7	0.9	99.1	37.0	90.9	2.9	100.0	83.9
Rapidan R	RAP08243	RAP659	d	other	Northern	66	2	10/28/96	74	15	68.2	8	72.7	27.0	44.1	36.5	100.0	18.9	36.7	1.4	98.6	52.7	68.3	3.1	100.0	73.6
Rapidan R	RAP08243	RAP921	d	other	Northern	66	2	4/30/97	206	15	68.2	11	100.0	54.4	88.7	32.0	89.9	27.2	52.7	0.5	99.5	54.4	65.9	3.2	99.9	83.1
Rapidan R	RAP08243	RAP935	d	other	Northern	66	2	10/6/97	140	18	81.8	11	100.0	11.4	18.7	48.6	100.0	22.9	44.3	1.4	98.6	30.0	100.0	2.9	100.0	80.4
Rapidan R	RAP08243	RAP1219	d	other	Northern	66	2	4/7/98	173	18	81.8	13	100.0	37.0	60.4	38.2	100.0	27.7	53.8	0.6	99.4	26.6	100.0	2.8	100.0	86.9
Rapidan R	RAP08243	RAP1265	d	other	Northern	66	2	10/13/98	158	19	86.4	11	100.0	15.2	24.8	44.9	100.0	22.2	42.9	0.6	99.4	27.8	100.0	3.2	99.8	81.7
Reed Cr	RDC03324	RED119	d	other	SWest	67	4	10/24/94	156	15	68.2	9	81.8	15.4	25.1	16.0	45.0	67.9	100.0	3.2	96.8	60.9	56.5	3.6	94.6	71.0
Reed Cr	RDC03324	RDC497	d	other	SWest	67	4	4/25/96	97	12	54.5	7	63.6	9.3	15.1	25.8	72.3	43.3	83.9	12.4	87.6	47.4	75.9	4.4	82.9	67.0
Redbud Run	RED00046	RED2870	v	str	Valley	67	2	11/2/00	113	12	54.5	8	72.7	31.0	50.6	4.4	12.4	0.9	1.7	6.2	93.8	71.7	40.9	4.9	74.4	50.1
Rockfish R	RKF02333	RKF570	d	other	Valley	64	4	5/22/96	101	19	86.4	9	81.8	25.7	42.0	20.8	58.4	10.9	21.1	19.8	80.2	33.7	95.8	4.1	86.0	69.0
Rockfish R	RKF02333	RKF991	d	other	Valley	64	4	10/20/97	112	17	77.3	10	90.9	6.3	10.2	30.4	85.2	10.7	20.8	10.7	89.3	55.4	64.5	4.3	84.1	65.3
Rockfish R	RKF02333	RKF1326	d	other	Valley	64	4	10/13/98	126	12	54.5	5	45.5	23.8	38.9	20.6	57.9	32.5	63.1	2.4	97.6	42.1	83.7	4.1	87.1	66.0
Rockfish R	RKF02333	RKF1392	v	other	Valley	64	4	5/12/99	122	17	77.3	10	90.9	35.2	57.5	20.5	57.5	13.9	27.0	28.7	71.3	47.5	75.8	4.0	88.9	68.3
Rockfish R	RKF02333	RKF2810	v	other	Valley	64	4	4/20/00	115	16	72.7	11	100.0	71.3	100.0	11.3	31.7	6.1	11.8	10.4	89.6	63.5	52.8	4.3	83.4	67.8
Rockfish R	RKF02333	RKF2871	v	other	Valley	64	4	10/19/00	140	17	77.3	11	100.0	8.6	14.0	35.0	98.2	20.7	40.1	15.0	85.0	41.4	84.6	4.1	86.9	73.3
Randolf Cr	RND00357	RND6373	v	other	SCRO	45	2	4/12/01	57	12	54.5	2	18.2	0.0	0.0	15.8	44.3	22.8	44.2	31.6	68.4	47.4	76.0	5.1	72.4	47.3
Randolf Cr	RND00357	RND6374	v	other	SCRO	45	2	10/29/01	81	16	72.7	3	27.3	0.0	0.0	8.6	24.3	4.9	9.6	12.3	87.7	24.7	100.0	5.9	60.6	47.8
NF Roanoke R	RNF00901	RNF1605	v	other	WCentral	67	4	5/7/01	133	18	81.8	8	72.7	31.6	51.5	0.0	0.0	36.8	71.4	19.5	80.5	48.1	74.9	4.5	81.3	64.3
NF Roanoke R	RNF00901	RNF1660	v	other	WCentral	67	4	11/8/01	111	19	86.4	7	63.6	17.1	27.9	4.5	12.6	47.7	92.5	13.5	86.5	49.5	72.9	4.3	83.8	65.8
NF Roanoke R	RNF00901	RNF1666	v	other	WCentral	67	4	11/8/01	120	17	77.3	6	54.5	4.2	6.8	5.8	16.4	55.8	100.0	10.8	89.2	57.5	61.4	4.4	82.2	61.0

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
NF Roanoke R	RNF01550	RNF1621	v	other	WCentral	67	3	4/11/01	103	15	68.2	5	45.5	39.8	65.0	1.0	2.7	28.2	54.6	21.4	78.6	54.4	65.9	4.6	79.0	57.4
NF Roanoke R	RNF01550	RNF1661	v	other	WCentral	67	3	11/8/01	118	16	72.7	7	63.6	8.5	13.8	6.8	19.0	32.2	62.4	32.2	67.8	53.4	67.3	5.0	72.9	55.0
Roanoke R	ROA09746	ROA1445	v	other	WCentral			7/21/99	148	14	63.6	7	63.6	54.7	89.3	0.0	0.0	15.5	30.1	2.0	98.0	50.7	71.2	4.3	84.4	62.6
Roanoke R	ROA09746	ROA1451	v	other	WCentral			8/23/99	133	9	40.9	4	36.4	38.3	62.6	0.0	0.0	10.5	20.4	0.0	100.0	41.4	84.7	4.6	79.3	53.0
Roanoke R	ROA10743	ROA107.4	v	other	WCentral			7/19/99	81	13	59.1	6	54.5	13.6	22.2	0.0	0.0	32.1	62.2	0.0	100.0	66.7	48.1	4.9	74.4	52.6
Roanoke R	ROA10743	ROA1450	v	other	WCentral			8/23/99	99	13	59.1	6	54.5	25.3	41.2	0.0	0.0	20.2	39.2	1.0	99.0	68.7	45.2	5.1	72.3	51.3
Roanoke R	ROA11676	ROA1449	v	other	WCentral			8/24/99	117	16	72.7	8	72.7	44.4	72.5	10.3	28.8	17.9	34.8	11.1	88.9	32.5	97.5	4.7	77.6	68.2
Roanoke R	ROA12385	ROA123.8	v	other	WCentral			7/21/99	124	12	54.5	6	54.5	16.1	26.3	14.5	40.7	4.8	9.4	2.4	97.6	60.5	57.1	4.9	75.3	51.9
Roanoke R	ROA12385	ROA1448	v	other	WCentral			8/23/99	192	11	50.0	4	36.4	7.8	12.8	0.0	0.0	1.0	2.0	1.6	98.4	81.3	27.1	6.3	53.9	35.1
Roanoke R	ROA12827	ROA128.2	v	other	WCentral			7/21/99	105	12	54.5	6	54.5	21.9	35.8	0.0	0.0	10.5	20.3	0.0	100.0	61.9	55.0	4.8	76.0	49.5
Roanoke R	ROA12827	ROA1447	v	other	WCentral			8/23/99	132	14	63.6	7	63.6	33.3	54.4	2.3	6.4	8.3	16.1	1.5	98.5	55.3	64.6	5.4	67.0	54.3
Roanoke R	ROA12897	ROA128.9	v	other	WCentral			7/21/99	125	14	63.6	7	63.6	23.2	37.9	0.0	0.0	10.4	20.2	0.8	99.2	56.0	63.6	5.2	70.5	52.3
Roanoke R	ROA12897	ROA1446	v	other	WCentral			9/14/99	177	14	63.6	4	36.4	24.9	40.6	0.0	0.0	23.2	44.9	0.6	99.4	42.9	82.4	5.0	73.9	55.2
Roanoke R	ROA20220	ROA8	d	other	WCentral	67	4	11/9/94	118	9	40.9	3	27.3	8.5	13.8	0.0	0.0	16.9	32.8	0.8	99.2	82.2	25.7	5.5	65.8	38.2
Roanoke R	ROA20220	ROA205	d	other	WCentral	67	4	4/19/95	88	11	50.0	3	27.3	21.6	35.2	0.0	0.0	13.6	26.4	25.0	75.0	43.2	82.1	5.4	68.3	45.5
Roanoke R	ROA20220	ROA388	d	other	WCentral	67	4	10/26/95	106	10	45.5	2	18.2	0.9	1.5	0.0	0.0	8.5	16.5	12.3	87.7	76.4	34.1	5.8	61.6	33.1
Roanoke R	ROA20220	ROA534	d	other	WCentral	67	4	5/8/96	100	11	50.0	1	9.1	3.0	4.9	0.0	0.0	7.0	13.6	38.0	62.0	51.0	70.8	7.7	33.8	30.5
Roanoke R	ROA20220	ROA752	d	other	WCentral	67	4	10/16/96	88	7	31.8	2	18.2	2.3	3.7	0.0	0.0	8.0	15.4	26.1	73.9	61.4	55.8	6.5	52.1	31.4
Roanoke R	ROA20220	ROA867	d	other	WCentral	67	4	5/8/97	57	11	50.0	4	36.4	10.5	17.2	0.0	0.0	43.9	85.0	14.0	86.0	49.1	73.5	5.0	73.0	52.6
Roanoke R	ROA20220	ROA1053	d	other	WCentral	67	4	11/5/97	109	8	36.4	2	18.2	7.3	12.0	0.0	0.0	13.8	26.7	3.7	96.3	83.5	23.9	5.8	61.3	34.3
Roanoke R	ROA20220	ROA1570	v	other	WCentral	67	4	10/5/00	184	12	54.5	3	27.3	3.3	5.3	0.0	0.0	33.2	64.2	40.2	59.8	66.3	48.7	5.4	68.0	41.0
Roanoke R	ROA20220	ROA1654	v	other	WCentral	67	4	11/26/01	120	13	59.1	7	63.6	25.8	42.2	2.5	7.0	31.7	61.4	15.0	85.0	50.0	72.2	5.4	67.4	57.2
Roanoke R	ROA20567	ROA1576	v	other	WCentral	67	4	10/11/00	185	15	68.2	4	36.4	6.5	10.6	1.1	3.0	30.8	59.7	45.4	54.6	57.3	61.7	5.6	65.1	44.9
Roanoke R	ROA20603	ROA1058	d	other	WCentral	67	4	11/5/97	97	9	40.9	3	27.3	8.2	13.5	0.0	0.0	8.2	16.0	3.1	96.9	81.4	26.8	5.8	62.0	35.4
Roanoke R	ROA20603	ROA1171	d	other	WCentral	67	4	6/11/98	108	19	86.4	4	36.4	5.6	9.1	2.8	7.8	32.4	62.8	16.7	83.3	41.7	84.3	5.0	73.1	55.4
Roanoke R	ROA20603	ROA1342	d	other	WCentral	67	4	11/12/98	89	8	36.4	2	18.2	12.4	20.2	0.0	0.0	21.3	41.4	7.9	92.1	68.5	45.4	5.9	60.9	39.3
Roanoke R	ROA20695	ROA881	d	other	WCentral	67	4	5/8/97	86	11	50.0	5	45.5	19.8	32.3	0.0	0.0	50.0	96.9	10.5	89.5	60.5	57.1	4.9	74.8	55.8
Roanoke R	ROA20695	ROA1057	d	other	WCentral	67	4	11/5/97	123	10	45.5	4	36.4	11.4	18.6	0.0	0.0	22.0	42.5	4.1	95.9	70.7	42.3	5.5	66.3	43.4
Roanoke R	ROA20695	ROA1170	d	other	WCentral	67	4	6/11/98	102	11	50.0	3	27.3	3.9	6.4	0.0	0.0	52.0	100.0	9.8	90.2	59.8	58.1	4.9	75.2	50.9
Roanoke R	ROA20695	ROA1343	d	other	WCentral	67	4	11/12/98	131	8	36.4	2	18.2	1.5	2.5	0.0	0.0	27.5	53.3	6.9	93.1	76.3	34.2	5.7	62.8	37.6
Roanoke R	ROA20695	ROA1415	v	other	WCentral	67	4	4/5/99	99	11	50.0	4	36.4	39.4	64.3	0.0	0.0	9.1	17.6	6.1	93.9	70.7	42.3	5.3	68.7	46.7
Roanoke R	ROA20695	ROA1569	v	other	WCentral	67	4	10/11/00	100	9	40.9	3	27.3	8.0	13.1	0.0	0.0	53.0	100.0	6.0	94.0	58.0	60.7	5.2	70.1	50.8
Roanoke R	ROA20695	ROA1653	v	other	WCentral	67	4	11/26/01	127	11	50.0	5	45.5	26.8	43.7	8.7	24.3	34.6	67.1	33.9	66.1	48.8	73.9	4.8	76.3	55.9
Roanoke R	ROA21217	ROA9	d	other	WCentral	67	4	11/9/94	118	14	63.6	7	63.6	22.0	36.0	4.2	11.9	14.4	27.9	0.0	100.0	69.5	44.1	5.0	73.8	52.6
Roanoke R	ROA21217	ROA206	d	other	WCentral	67	4	4/19/95	99	8	36.4	5	45.5	73.7	100.0	7.1	19.8	14.1	27.4	7.1	92.9	68.7	45.2	3.9	89.2	57.1
Roanoke R	ROA21217	ROA387	d	other	WCentral	67	4	10/26/95	117	16	72.7	6	54.5	17.9	29.3	3.4	9.6	29.9	58.0	0.9	99.1	53.0	67.9	4.8	76.1	58.4
Roanoke R	ROA21217	ROA533	d	other	WCentral	67	4	5/8/96	96	13	59.1	7	63.6	68.8	100.0	7.3	20.5	36.5	70.7	4.2	95.8	50.0	72.2	3.8	90.8	71.6
Roanoke R	ROA21217	ROA751	d	other	WCentral	67	4	10/16/96	98	9	40.9	4	36.4	23.5	38.3	0.0	0.0	39.8	77.1	4.1	95.9	45.9	78.1	4.8	76.2	55.4
Roanoke R	ROA21217	ROA866	d	other	WCentral	67	4	6/10/97	111	13	59.1	7	63.6	24.3	39.7	2.7	7.6	19.8	38.4	3.6	96.4	55.0	65.1	4.8	76.5	55.8
Roanoke R	ROA21217	ROA1052	d	other	WCentral	67	4	11/5/97	119	12	54.5	5	45.5	41.2	67.2	1.7	4.7	17.6	34.2	1.7	98.3	73.9	37.6	4.3	83.8	53.2
Roanoke R	ROA21217	ROA1156	d	other	WCentral	67	4	5/26/98	87	10	45.5	6	54.5	40.2	65.7	3.4	9.7	26.4	51.2	5.7	94.3	42.5	83.0	4.5	80.6	60.6
Roanoke R	ROA21217	ROA1344	d	other	WCentral	67	4	11/12/98	154	12	54.5	5	45.5	22.7	37.1	7.8	21.9	12.3	23.9	1.9	98.1	73.4	38.5	5.0	73.9	49.2
Roanoke R	ROA21217	ROA1414	v	other	WCentral	67	4	3/4/99	97	15	68.2	8	72.7	43.3	70.7	6.2	17.4	15.5	30.0	2.1	97.9	55.7	64.0	4.4	82.7	63.0
Roanoke R	ROA21217	ROA1474	v	other	WCentral	67	4	10/28/99	85	8	36.4	5	45.5	32.9	53.8	2.4	6.6	38.8	75.2	5.9	94.1	45.9	78.2	4.4	82.3	59.0
Roanoke R	ROA21217	ROA1516	v	other	WCentral	67	4	5/8/00	47	10	45.5	5	45.5	34.0	55.6	2.1	6.0	14.9	28.9	23.4	76.6	46.8	76.8	5.2	70.0	50.6
Roanoke R	ROA21217	ROA1568	v	other	WCentral	67	4	10/11/00	161	17	77.3	6	54.5	31.1	50.7	3.7	10.5	34.8	67.4	5.6	94.4	41.0	85.2	4.6	80.0	65.0
Roanoke R	ROA21217	ROA1652	v	other	WCentral	67	4	11/26/01	107	11	50.0	6	54.5	33.6	54.9	5.6	15.7	41.1	79.7	2.8	97.2	48.6	74.2	4.6	79.0	63.2
Robinson R	ROB00404	ROB2976	v	other	Northern	64	4	4/10/01	251	14	63.6	6	54.5	74.5	100.0	5.6	15.7	17.9	34.7	0.0	100.0	68.9	44.9	3.9	89.1	62.8
Robinson R	ROB00404	ROB3011	v	other	Northern	64	4	10/3/01	95	14	63.6	9	81.8	34.7	56.7	12.6	35.5	24.2	46.9	0.0	100.0	44.2	80.6	3.9	89.1	69.3

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Robinson R	ROB00404	ROB3025	v	other	Northern	64	4	4/16/02	100	11	50.0	7	63.6	50.0	81.6	9.0	25.3	17.0	32.9	0.0	100.0	46.0	78.0	4.3	84.1	64.4
Robinson R	ROB00542	ROB2986	v	other	Northern	64	4	4/10/01	240	16	72.7	6	54.5	60.0	97.9	4.2	11.7	22.9	44.4	0.8	99.2	57.5	61.4	4.2	85.5	65.9
Robinson R	ROB00542	ROB3014	v	other	Northern	64	4	10/18/01	107	8	36.4	6	54.5	46.7	76.3	18.7	52.5	15.9	30.8	0.0	100.0	48.6	74.2	3.7	93.1	64.7
Robinson R	ROB00542	ROB3037	v	other	Northern	64	4	5/22/02	103	12	54.5	8	72.7	41.7	68.1	20.4	57.2	21.4	41.4	0.0	100.0	41.7	84.1	4.0	88.6	70.9
Rappahannock	RPP17551	RPP183	d	other	Northern	64	2	9/15/94	104	20	90.9	7	63.6	31.7	51.8	14.4	40.5	23.1	44.7	4.8	95.2	29.8	100.0	4.2	85.8	71.6
Rappahannock	RPP17551	RPP347	d	other	Northern	64	2	5/17/95	97	19	86.4	8	72.7	45.4	74.0	29.9	83.9	19.6	38.0	1.0	99.0	33.0	96.8	3.3	98.3	81.1
Rappahannock	RPP17551	RPP471	d	other	Northern	64	2	11/29/95	145	24	100.0	7	63.6	36.6	59.7	15.2	42.6	23.4	45.4	0.7	99.3	31.0	99.6	4.0	88.4	74.8
Rappahannock	RPP17551	RPP598	d	other	Northern	64	2	5/30/96	127	22	100.0	8	72.7	37.0	60.4	17.3	48.6	26.8	51.9	2.4	97.6	35.4	93.3	4.1	86.1	76.3
Rappahannock	RPP17551	RPP666	d	other	Northern	64	2	11/26/96	142	17	77.3	7	63.6	38.7	63.2	14.8	41.5	24.6	47.8	6.3	93.7	33.8	95.6	3.8	91.0	71.7
SF Rivanna R	RRS01030	RRS2882	v	other	Valley	64		5/22/01	98	12	54.5	5	45.5	14.3	23.3	0.0	0.0	18.4	35.6	43.9	56.1	59.2	59.0	5.8	61.6	42.0
SF Rivanna R	RRS01030	RRS2899	v	other	Valley	64		10/1/01	125	16	72.7	0	0.0	0.0	0.0	0.0	0.0	30.4	58.9	41.6	58.4	68.0	46.2	5.8	61.1	37.2
Roses Cr	RSE00668	RSE145	d	other	Piedmont	45	1	11/14/94	112	17	77.3	6	54.5	26.8	43.7	1.8	5.0	30.4	58.8	19.6	80.4	34.8	94.1	4.8	76.6	61.3
Roses Cr	RSE00668	RSE324	d	other	Piedmont	45	1	5/5/95	102	17	77.3	8	72.7	34.3	56.0	24.5	68.8	35.3	68.4	9.8	90.2	35.3	93.5	3.5	94.8	77.7
Roses Cr	RSE00668	RSE728	d	other	Piedmont	45	1	10/25/96	66	13	59.1	6	54.5	51.5	84.1	7.6	21.3	39.4	76.3	15.2	84.8	53.0	67.8	4.4	82.8	66.4
Roses Cr	RSE00668	RSE841	d	other	Piedmont	45	1	5/30/97	85	14	63.6	7	63.6	27.1	44.2	17.6	49.5	37.6	73.0	17.6	82.4	36.5	91.8	4.0	87.7	69.5
Roses Cr	RSE00668	RSE1131	d	other	Piedmont	45	1	11/18/97	106	17	77.3	8	72.7	21.7	35.4	17.0	47.7	26.4	51.2	9.4	90.6	26.4	100.0	4.5	81.4	69.5
Roses Cr	RSE00668	RSE1240	d	other	Piedmont	45	1	5/15/98	74	10	45.5	3	27.3	35.1	57.4	0.0	0.0	21.6	41.9	13.5	86.5	41.9	83.9	4.4	81.6	53.0
S. Fork Roanok	RSF01243	RSF1412	v	other	WCentral	67		3/18/99	100	12	54.5	5	45.5	66.0	100.0	0.0	0.0	14.0	27.1	15.0	85.0	57.0	62.1	4.9	75.2	56.2
S. Fork Roanok	RSF01243	RSF1475	v	other	WCentral	67		10/28/99	103	15	68.2	7	63.6	27.2	44.4	0.0	0.0	50.5	97.8	9.7	90.3	49.5	72.9	3.8	91.5	66.1
S. Fork Roanok	RSF01243	RSF1514	v	other	WCentral	67		5/3/00	119	19	86.4	8	72.7	58.0	94.6	3.4	9.4	26.9	52.1	7.6	92.4	47.9	75.3	4.2	85.0	71.0
S. Fork Roanok	RSF01243	RSF1567	v	other	WCentral	67		10/12/00	317	19	86.4	7	63.6	29.3	47.9	0.0	0.0	19.9	38.5	5.4	94.6	41.6	84.3	4.6	79.3	61.8
Rivanna R	RVN01205	RVN2887	v	other	Valley	45		5/14/01	112	15	68.2	6	54.5	14.3	23.3	2.7	7.5	21.4	41.5	54.5	45.5	67.0	47.7	5.7	63.2	44.0
Stoney Cr	SCR00018	SCR1432	v	other	WCentral	45		6/7/99	109	19	86.4	11	100.0	17.4	28.5	24.8	69.5	22.9	44.4	8.3	91.7	34.9	94.1	4.1	86.0	75.1
SF Holston R	SFH09742	SFH1086	d	other	SWest	67	4	10/23/97	91	16	72.7	9	81.8	51.6	84.3	7.7	21.6	72.5	100.0	3.3	96.7	65.9	49.2	3.7	92.0	74.8
Slemp Cr	SLM00211	SLM2897	v	other	SWest	66	1	5/9/01	91	17	77.3	10	90.9	29.7	48.4	0.0	0.0	8.8	17.0	23.1	76.9	42.9	82.5	3.8	91.1	60.5
Slemp Cr	SLM00211	SLM2910	v	other	SWest	66	1	10/30/01	99	11	50.0	6	54.5	0.0	0.0	57.6	100.0	6.1	11.7	27.3	72.7	62.6	54.0	3.0	100.0	55.4
Saint Marys Riv	SMR00152	SMR446	d	other	Valley	66	2	10/19/95	127	18	81.8	12	100.0	29.1	47.6	32.3	90.6	28.3	54.9	2.4	97.6	52.8	68.2	3.8	91.4	79.0
Saint Marys Riv	SMR00152	SMR821	d	other	Valley	66	2	5/5/97	117	21	95.5	15	100.0	9.4	15.3	32.5	91.2	3.4	6.6	33.3	66.7	46.2	77.8	4.4	82.8	67.0
Saint Marys Riv	SMR00152	SMR993	d	other	Valley	66	2	10/9/97	112	24	100.0	12	100.0	15.2	24.8	37.5	100.0	21.4	41.5	3.6	96.4	34.8	94.1	3.8	90.4	80.9
Smith Cr	SMT00571	SMT69	d	other	Valley	67	3	10/5/94	107	12	54.5	4	36.4	21.5	35.1	2.8	7.9	19.6	38.0	25.2	74.8	35.5	93.1	5.0	73.9	51.7
Smith Cr	SMT00571	SMT260	d	other	Valley	67	3	5/22/95	157	23	100.0	9	81.8	24.8	40.5	5.7	16.1	35.7	69.1	8.9	91.1	28.7	100.0	4.8	77.0	72.0
Smith Cr	SMT00571	SMT439	d	other	Valley	67	3	9/28/95	116	18	81.8	5	45.5	19.8	32.4	1.7	4.8	46.6	90.2	4.3	95.7	43.1	82.2	4.6	79.4	64.0
Smith Cr	SMT00571	SMT571	d	other	Valley	67	3	5/23/96	154	17	77.3	6	54.5	28.6	46.6	2.6	7.3	16.9	32.7	15.6	84.4	41.6	84.4	5.1	72.6	57.5
Smith Cr	SMT00571	SMT812	d	other	Valley	67	3	5/27/97	116	15	68.2	7	63.6	39.7	64.7	4.3	12.1	17.2	33.4	36.2	63.8	57.8	61.0	4.6	79.3	55.8
Smith Cr	SMT00571	SMT994	d	other	Valley	67	3	9/23/97	100	17	77.3	4	36.4	23.0	37.5	0.0	0.0	43.0	83.3	4.0	96.0	36.0	92.4	4.7	78.0	62.6
Smith Cr	SMT00571	SMT1317	d	other	Valley	67	3	10/20/98	100	14	63.6	8	72.7	39.0	63.7	4.0	11.2	44.0	85.3	3.0	97.0	40.0	86.7	4.2	84.8	70.6
Smith Cr	SMT00662	SMT1425	v	other	Valley	67	3	5/18/99	119	12	54.5	5	45.5	37.8	61.7	1.7	4.7	42.0	81.4	17.6	82.4	48.7	74.0	4.6	79.3	60.5
Smith Cr	SMT00662	SMT2749	v	other	Valley	67	3	10/14/99	122	16	72.7	8	72.7	23.0	37.5	4.1	11.5	59.8	100.0	3.3	96.7	51.6	69.9	4.2	85.6	68.3
Smith Cr	SMT00662	SMT2811	v	other	Valley	67	3	4/17/00	148	15	68.2	6	54.5	48.0	78.3	0.7	1.9	23.0	44.5	25.0	75.0	64.9	50.8	4.5	80.3	56.7
Smith Cr	SMT00662	SMT2872	v	other	Valley	67	3	11/2/00	218	14	63.6	8	72.7	43.6	71.1	17.0	47.6	22.9	44.4	11.5	88.5	36.2	92.1	3.8	90.5	71.3
Smith Cr	SMT00662	SMT2902	v	other	Valley	67	3	9/27/01	150	12	54.5	6	54.5	7.3	12.0	6.0	16.8	18.7	36.2	31.3	68.7	50.7	71.3	5.3	68.4	47.8
Stony Cr	SNC00020	SNC382	d	other	WCentral	67	3	11/17/95	90	10	45.5	5	45.5	13.3	21.8	41.1	100.0	10.0	19.4	6.7	93.3	46.7	77.0	3.0	100.0	62.8
Stony Cr	SNC00020	SNC519	d	other	WCentral	67	3	5/2/96	89	12	54.5	9	81.8	71.9	100.0	13.5	37.8	27.0	52.3	5.6	94.4	51.7	69.8	3.6	94.4	73.1
Stony Cr	SNC00020	SNC744	d	other	WCentral	67	3	11/5/96	102	15	68.2	12	100.0	53.9	88.0	18.6	52.3	20.6	39.9	3.9	96.1	41.2	85.0	3.5	95.4	78.1
Stony Cr	SNC00020	SNC872	d	other	WCentral	67	3	5/6/97	117	10	45.5	6	54.5	53.0	86.5	20.5	57.6	37.6	72.9	1.7	98.3	53.0	67.9	3.1	100.0	72.9
Stony Cr	SNC00020	SNC1155	d	other	WCentral	67	3	4/29/98	101	8	36.4	7	63.6	75.2	100.0	17.8	50.0	54.5	100.0	0.0	100.0	70.3	42.9	3.7	92.7	73.2
Stony Cr	SNC00020	SNC1408	v	other	WCentral	67	3	3/17/99	61	12	54.5	8	72.7	45.9	74.9	9.8	27.6	4.9	9.5	26.2	73.8	63.9	52.1	4.7	78.5	55.5
Stony Cr	SNC00020	SNC1464	v	other	WCentral	67	3	11/17/99	73	9	40.9	6	54.5	8.2	13.4	82.2	100.0	1.4	2.7	0.0	100.0	80.8	27.7	1.5	100.0	54.9
Stony Cr	SNC00020	SNC1507	v	other	WCentral	67	3	4/11/00	106	13	59.1	9	81.8	48.1	78.5	35.8	100.0	26.4	51.2	0.0	100.0	44.3	80.4	2.7	100.0	81.4

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Stony Cr	SNC00020	SNC1556	v	other	WCentral	67	3	11/9/00	270	18	81.8	13	100.0	52.2	85.2	16.3	45.7	41.1	79.7	0.7	99.3	65.9	49.2	4.0	87.9	78.6
Stony Cr	SNC00288	SNC217	d	other	WCentral	67	3	5/2/95	103	14	63.6	9	81.8	81.6	100.0	6.8	19.1	29.1	56.4	1.9	98.1	56.3	63.1	3.6	94.3	72.1
Stony Cr	SNC00288	SNC381	d	other	WCentral	67	3	11/17/95	98	12	54.5	6	54.5	23.5	38.3	9.2	25.8	16.3	31.6	0.0	100.0	51.0	70.7	4.6	79.5	56.9
Stony Cr	SNC00288	SNC522	d	other	WCentral	67	3	5/2/96	69	12	54.5	7	63.6	46.4	75.7	23.2	65.1	33.3	64.6	2.9	97.1	49.3	73.3	3.6	93.9	73.5
Stony Cr	SNC00288	SNC745	d	other	WCentral	67	3	11/5/96	113	15	68.2	11	100.0	33.6	54.9	11.5	32.3	3.5	6.9	12.4	87.6	47.8	75.4	4.3	84.3	63.7
Stony Cr	SNC00288	SNC855	d	other	WCentral	67	3	5/6/97	108	14	63.6	8	72.7	69.4	100.0	13.0	36.4	23.1	44.9	0.9	99.1	66.7	48.1	3.6	93.3	69.8
Stony Cr	SNC00288	SNC1039	d	other	WCentral	67	3	10/14/97	101	11	50.0	6	54.5	9.9	16.2	4.0	11.1	2.0	3.8	0.0	100.0	84.2	22.9	5.3	68.8	40.9
Stony Cr	SNC00288	SNC1179	d	other	WCentral	67	3	4/29/98	101	13	59.1	10	90.9	68.3	100.0	17.8	50.0	35.6	69.1	6.9	93.1	59.4	58.6	3.5	95.2	77.0
Stony Cr	SNC00288	SNC1355	d	other	WCentral	67	3	11/4/98	95	10	45.5	8	72.7	11.6	18.9	7.4	20.7	3.2	6.1	0.0	100.0	80.0	28.9	4.9	75.6	46.1
Stony Cr	SNC00288	SNC	v	other	WCentral	67	3	3/17/99	145	16	72.7	12	100.0	48.3	78.8	12.4	34.8	17.9	34.8	3.4	96.6	43.4	81.7	4.2	85.5	73.1
Stony Cr	SNC00288	SNC1465	v	other	WCentral	67	3	11/17/99	123	13	59.1	9	81.8	24.4	39.8	22.8	63.9	2.4	4.7	0.0	100.0	56.9	62.2	4.2	85.3	62.1
Stony Cr	SNC00288	SNC1508	v	other	WCentral	67	3	4/11/00	111	16	72.7	11	100.0	60.4	98.5	23.4	65.7	11.7	22.7	0.9	99.1	39.6	87.2	3.5	95.5	80.2
Stony Cr	SNC00288	SNC1555	v	other	WCentral	67	3	11/9/00	259	15	68.2	11	100.0	22.0	35.9	31.3	87.8	2.7	5.2	1.5	98.5	57.1	61.9	4.2	85.0	67.8
NF South Mayo	SNF00764	SNF1613	v	other	WCentral	66	1	5/17/01	125	12	54.5	8	72.7	72.0	100.0	0.0	0.0	20.0	38.8	2.4	97.6	78.4	31.2	4.1	87.3	60.3
NF South Mayo	SNF00764	SNF1657	v	other	WCentral	66	1	11/19/01	109	14	63.6	6	54.5	11.0	18.0	0.0	0.0	15.6	30.2	42.2	57.8	53.2	67.6	5.1	72.7	45.6
Sinking Cr	SNK00103	SIN294	d	other	SWest	67	4	7/5/95	138	14	63.6	7	63.6	24.6	40.2	10.1	28.5	23.2	44.9	5.8	94.2	46.4	77.5	4.6	78.8	61.4
Sinking Cr	SNK00103	SNK357	d	other	SWest	67	4	12/14/95	107	18	81.8	7	63.6	18.7	30.5	3.7	10.5	56.1	100.0	9.3	90.7	46.7	76.9	4.5	80.2	66.8
Snow Cr	SNW01008	SNW1506	v	other	WCentral	45		4/6/00	143	14	63.6	10	90.9	58.0	94.7	10.5	29.4	39.2	75.9	2.1	97.9	51.7	69.7	3.9	89.7	76.5
South Run	SOT00144	SOT180	d	other	Northern	64	2	9/13/94	107	16	72.7	3	27.3	13.1	21.4	0.9	2.6	15.0	29.0	15.9	84.1	39.3	87.7	5.7	62.6	48.4
South Run	SOT00144	SOT336	d	other	Northern	64	2	4/18/95	98	23	100.0	5	45.5	19.4	31.6	0.0	0.0	19.4	37.6	13.3	86.7	26.5	100.0	6.0	59.2	57.6
South Run	SOT00144	SOT459	d	other	Northern	64	2	9/15/95	89	18	81.8	4	36.4	32.6	53.2	2.2	6.3	37.1	71.9	4.5	95.5	47.2	76.3	6.0	58.9	60.0
South Run	SOT00144	SOT582	d	other	Northern	64	2	4/16/96	85	16	72.7	2	18.2	10.6	17.3	0.0	0.0	18.8	36.5	45.9	54.1	49.4	73.1	6.1	57.9	41.2
South Run	SOT00144	SOT653	d	other	Northern	64	2	10/21/96	123	19	86.4	4	36.4	14.6	23.9	7.3	20.5	24.4	47.3	3.3	96.7	44.7	79.9	5.1	71.6	57.8
South Run	SOT00144	SOT906	d	other	Northern	64	2	3/11/97	152	16	72.7	4	36.4	30.3	49.4	11.2	31.4	28.9	56.1	7.2	92.8	44.7	79.8	5.1	72.1	61.3
South Run	SOT00144	SOT938	d	other	Northern	64	2	9/17/97	94	18	81.8	4	36.4	31.9	52.1	0.0	0.0	43.6	84.5	4.3	95.7	43.6	81.4	4.8	77.1	63.6
South Run	SOT00144	SOT1224	d	other	Northern	64	2	3/30/98	127	20	90.9	4	36.4	29.9	48.8	14.2	39.8	38.6	74.8	12.6	87.4	40.9	85.3	4.9	74.5	67.2
South Run	SOT00144	SOT1269	d	other	Northern	64	2	10/21/98	84	17	77.3	4	36.4	34.5	56.4	8.3	23.4	41.7	80.7	9.5	90.5	41.7	84.3	5.0	73.7	65.3
South Run	SOT00144	SOT1408	v	other	Northern	64	2	3/30/99	117	18	81.8	3	27.3	15.4	25.1	7.7	21.6	39.3	76.2	8.5	91.5	33.3	96.3	5.8	61.4	60.2
South Run	SOT00144	SOT1423	v	other	Northern	64	2	9/22/99	146	21	95.5	4	36.4	3.4	5.6	6.2	17.3	38.4	74.3	2.1	97.9	33.6	96.0	5.0	74.2	62.1
South Run	SOT00144	SOT2772	v	other	Northern	64	2	3/7/00	144	17	77.3	4	36.4	18.1	29.5	19.4	54.6	27.1	52.5	4.9	95.1	32.6	97.3	4.8	76.0	64.8
South Run	SOT00144	SOT2799	v	other	Northern	64	2	9/12/00	163	17	77.3	2	18.2	32.5	53.1	0.0	0.0	59.5	100.0	5.5	94.5	59.5	58.5	5.1	72.3	59.2
Spout Run	SPR00041	SPR47	d	other	Valley	67	2	10/19/94	101	12	54.5	5	45.5	14.9	24.2	6.9	19.5	10.9	21.1	5.9	94.1	54.5	65.8	5.6	64.0	48.6
Spout Run	SPR00041	SPR1306	d	other	Valley	67	2	10/9/98	114	13	59.1	5	45.5	8.8	14.3	22.8	64.0	8.8	17.0	9.6	90.4	64.0	51.9	5.1	71.9	51.8
Smith R	SRE04365	SRE1066	d	other	WCentral	45	4	11/2/97	63	15	68.2	10	90.9	20.6	33.7	19.0	53.5	4.8	9.2	0.0	100.0	46.0	78.0	5.5	66.0	62.4
Strait Cr	STC00072	STC575	d	other	Valley	67	2	5/9/96	101	13	59.1	6	54.5	27.7	45.3	5.0	13.9	3.0	5.8	57.4	42.6	72.3	40.0	5.4	67.2	41.1
Strait Cr	STC00072	STC817	d	other	Valley	67	2	5/21/97	124	18	81.8	11	100.0	21.8	35.5	20.2	56.6	7.3	14.1	31.5	68.5	38.7	88.5	4.8	76.1	65.2
Strait Cr	STC00072	STC1288	d	other	Valley	67	2	10/28/98	125	13	59.1	7	63.6	11.2	18.3	2.4	6.7	12.8	24.8	18.4	81.6	72.0	40.4	5.3	68.4	45.4
Strait Cr	STC00072	STC2754	v	other	Valley	67	2	10/13/99	122	12	54.5	7	63.6	9.8	16.1	3.3	9.2	8.2	15.9	12.3	87.7	69.7	43.8	5.8	62.2	44.1
Strait Cr	STC00072	STC2812	v	other	Valley	67	2	5/4/00	144	17	77.3	10	90.9	11.1	18.1	5.6	15.6	4.2	8.1	42.4	57.6	66.0	49.2	5.8	61.8	47.3
Strait Cr	STC00072	STC2952	v	other	Valley	67	2	10/15/01	125	11	50.0	7	63.6	15.2	24.8	20.0	56.1	21.6	41.9	1.6	98.4	67.2	47.4	4.3	83.9	58.3
Stroubles Cr	STE00669	STE213	d	other	WCentral	67	1	5/3/95	114	6	27.3	1	9.1	0.0	0.0	0.0	0.0	6.1	11.9	47.4	52.6	78.9	30.4	5.8	61.6	24.1
Stroubles Cr	STE00669	STE401	d	other	WCentral	67	1	10/19/95	106	8	36.4	1	9.1	0.0	0.0	0.0	0.0	5.7	11.0	7.5	92.5	77.4	32.7	6.4	53.5	29.4
Stroubles Cr	STE00669	STE535	d	other	WCentral	67	1	6/6/96	96	12	54.5	2	18.2	0.0	0.0	2.1	5.8	39.6	76.7	3.1	96.9	54.2	66.2	5.5	66.4	48.1
Stroubles Cr	STE00669	STE750	d	other	WCentral	67	1	10/15/96	106	9	40.9	3	27.3	2.8	4.6	5.7	15.9	15.1	29.3	5.7	94.3	70.8	42.2	5.5	66.3	40.1
Stroubles Cr	STE00669	STE1035	d	other	WCentral	67	1	10/9/97	112	11	50.0	5	45.5	9.8	16.0	0.9	2.5	22.3	43.3	8.0	92.0	71.4	41.3	5.4	67.3	44.7
Stroubles Cr	STE00669	STE1165	d	other	WCentral	67	1	5/21/98	82	13	59.1	4	36.4	4.9	8.0	1.2	3.4	30.5	59.1	7.3	92.7	54.9	65.2	5.4	67.0	48.9
Stroubles Cr	STE00669	STE1426	v	other	WCentral	67	1	3/18/99	138	11	50.0	4	36.4	2.9	4.7	0.0	0.0	4.3	8.4	82.6	17.4	82.6	25.1	7.7	34.0	22.0
Stroubles Cr	STE00669	STE1463	v	other	WCentral	67	1	11/2/99	158	13	59.1	5	45.5	3.2	5.2	0.0	0.0	24.7	47.8	24.7	75.3	67.1	47.5	5.5	66.5	43.4
Stroubles Cr	STE00669	STE1520	v	other	WCentral	67	1	4/27/00	140	11	50.0	3	27.3	2.9	4.7	0.0	0.0	5.7	11.1	51.4	48.6	72.9	39.2	6.1	57.8	29.8

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Stroubles Cr	STE00669	STE1553	v	other	WCentral	67	1	11/6/00	224	10	45.5	4	36.4	2.7	4.4	0.9	2.5	1.3	2.6	13.8	86.2	72.8	39.3	6.0	59.2	34.5
Stroubles Cr	STE00669	STE1636	v	other	WCentral	67	1	10/18/01	111	17	77.3	5	45.5	3.6	5.9	0.0	0.0	16.2	31.4	5.4	94.6	63.1	53.4	5.8	61.8	46.2
South R	STH00021	STH82	d	other	Valley	67	4	10/4/94	171	20	90.9	7	63.6	21.1	34.4	11.1	31.2	44.4	86.1	7.0	93.0	38.6	88.7	4.0	87.7	72.0
South R	STH00021	STH265	d	other	Valley	67	4	5/25/95	117	31	100.0	12	100.0	17.9	29.3	16.2	45.6	28.2	54.7	10.3	89.7	19.7	100.0	4.2	85.7	75.6
South R	STH00021	STH996	d	other	Valley	67	4	10/2/97	129	22	100.0	10	90.9	35.7	58.2	10.9	30.5	24.8	48.1	3.9	96.1	43.4	81.7	4.0	87.7	74.2
South R	STH00021	STH1301	d	other	Valley	67	4	10/15/98	103	13	59.1	6	54.5	42.7	69.7	1.9	5.5	18.4	35.7	7.8	92.2	61.2	56.1	4.5	80.5	56.7
South R	STH00021	STH2750	v	other	Valley	67	4	10/25/99	133	15	68.2	6	54.5	21.8	35.6	0.8	2.1	45.9	88.9	8.3	91.7	50.4	71.7	4.6	79.1	61.5
South R	STH00021	STH2814	v	other	Valley	67	4	5/15/00	135	16	72.7	9	81.8	37.0	60.5	4.4	12.5	43.7	84.7	14.1	85.9	37.8	89.9	4.3	84.0	71.5
South R	STH00021	STH2954	v	other	Valley	67	4	10/16/01	127	16	72.7	8	72.7	33.9	55.3	6.3	17.7	37.8	73.2	6.3	93.7	45.7	78.5	4.6	79.6	67.9
South R	STH02172	STH84	d	other	Valley	67	4	10/25/94	165	24	100.0	7	63.6	1.8	3.0	4.2	11.9	41.8	81.0	6.7	93.3	48.5	74.4	5.4	67.8	61.9
South R	STH02172	STH267	d	other	Valley	67	4	5/4/95	105	21	95.5	8	72.7	10.5	17.1	7.6	21.4	20.0	38.8	16.2	83.8	42.9	82.5	5.3	68.7	60.1
South R	STH02172	STH449	d	other	Valley	67	4	10/19/95	106	11	50.0	2	18.2	9.4	15.4	0.0	0.0	24.5	47.5	1.9	98.1	64.2	51.8	6.0	59.1	42.5
South R	STH02172	STH1295	d	other	Valley	67	4	10/2/98	106	11	50.0	4	36.4	6.6	10.8	0.0	0.0	26.4	51.2	8.5	91.5	59.4	58.6	5.7	62.5	45.1
South R	STH02172	STH1424	v	other	Valley	67	4	5/24/99	106	14	63.6	4	36.4	3.8	6.2	0.9	2.6	32.1	62.2	32.1	67.9	58.5	60.0	6.0	59.3	44.8
South R	STH02172	STH2751	v	other	Valley	67	4	10/26/99	117	10	45.5	1	9.1	0.0	0.0	0.0	0.0	38.5	74.5	22.2	77.8	54.7	65.4	5.7	63.4	42.0
South R	STH02172	STH2815	v	other	Valley	67	4	4/11/00	204	11	50.0	3	27.3	2.0	3.2	0.0	0.0	10.8	20.9	40.7	59.3	77.0	33.3	6.7	48.8	30.4
South R	STH02172	STH2955	v	other	Valley	67	4	10/4/01	168	16	72.7	3	27.3	5.4	8.7	1.2	3.3	14.3	27.7	48.8	51.2	73.8	37.8	5.9	59.9	36.1
South R	STH02708	STH83	d	other	Valley	67	4	10/25/94	187	26	100.0	9	81.8	11.2	18.3	8.6	24.0	46.0	89.1	8.6	91.4	47.1	76.5	4.6	79.4	70.1
South R	STH02708	STH266	d	other	Valley	67	4	5/4/95	121	26	100.0	12	100.0	15.7	25.6	23.1	65.0	35.5	68.9	18.2	81.8	43.8	81.2	4.1	87.2	76.2
South R	STH02708	STH448	d	other	Valley	67	4	10/19/95	114	16	72.7	7	63.6	37.7	61.6	13.2	36.9	20.2	39.1	3.5	96.5	58.8	59.6	3.9	89.6	65.0
South R	STH02708	STH1323	d	other	Valley	67	4	10/2/98	128	16	72.7	7	63.6	9.4	15.3	1.6	4.4	14.8	28.8	6.3	93.8	72.7	39.5	5.6	64.6	47.8
South R	STH02708	STH2752	v	other	Valley	67	4	10/26/99	114	12	54.5	7	63.6	28.1	45.8	1.8	4.9	35.1	68.0	1.8	98.2	57.0	62.1	4.8	76.4	59.2
South R	STH02708	STH2816	v	other	Valley	67	4	4/11/00	110	12	54.5	6	54.5	58.2	95.0	2.7	7.7	10.9	21.1	12.7	87.3	68.2	46.0	4.4	81.6	56.0
South R	STH02708	STH2656	v	other	Valley	67	4	10/4/01	142	12	54.5	7	63.6	41.5	67.8	1.4	4.0	21.8	42.3	7.0	93.0	57.0	62.0	4.7	78.2	58.2
Stock Cr	STO00473	STO305	d	other	SWest	67	4	3/28/95	100	10	45.5	4	36.4	29.0	47.3	6.0	16.8	5.0	9.7	36.0	64.0	62.0	54.9	5.1	72.6	43.4
Stock Cr	STO00473	STO369	d	other	SWest	67	4	12/14/95	99	5	22.7	3	27.3	1.0	1.6	8.1	22.7	1.0	2.0	81.8	18.2	90.9	13.1	5.5	65.9	21.7
Stock Cr	STO00473	STO783	d	other	SWest	67	4	4/17/97	95	11	50.0	6	54.5	12.6	20.6	7.4	20.7	2.1	4.1	42.1	57.9	76.8	33.5	5.3	68.4	38.7
Stock Cr	STO00473	STO1098	d	other	SWest	67	4	11/5/97	92	11	50.0	5	45.5	6.5	10.6	3.3	9.2	17.4	33.7	32.6	67.4	57.6	61.2	5.0	74.0	43.9
Stock Cr	STO00473	STO1204	d	other	SWest	67	4	5/18/98	100	10	45.5	7	63.6	36.0	58.8	38.0	100.0	28.0	54.3	9.0	91.0	53.0	67.9	3.1	100.0	72.6
Stock Cr	STO00526	STO304	d	other	SWest	67	4	3/28/95	99	12	54.5	5	45.5	82.8	100.0	0.0	0.0	19.2	37.2	4.0	96.0	69.7	43.8	3.2	99.6	59.6
Stock Cr	STO00526	STO368	d	other	SWest	67	4	12/14/95	92	11	50.0	7	63.6	50.0	81.6	31.5	88.5	12.0	23.2	13.0	87.0	68.5	45.5	2.9	100.0	67.4
Stock Cr	STO00526	STO782	d	other	SWest	67	4	4/17/97	110	15	68.2	7	63.6	38.2	62.3	5.5	15.3	10.9	21.1	33.6	66.4	51.8	69.6	4.5	81.2	56.0
Stock Cr	STO00526	STO1097	d	other	SWest	67	4	11/5/97	120	9	40.9	4	36.4	13.3	21.8	2.5	7.0	4.2	8.1	28.3	71.7	64.2	51.8	5.3	68.5	38.3
Stock Cr	STO00526	STO1203	d	other	SWest	67	4	5/18/98	97	15	68.2	9	81.8	23.7	38.7	22.7	63.7	28.9	55.9	23.7	76.3	43.3	81.9	4.0	88.6	69.4
Stony Cr	STY00424	STY70	d	other	Valley	67	3	10/6/94	135	18	81.8	7	63.6	15.6	25.4	17.0	47.8	20.7	40.2	9.6	90.4	30.4	100.0	4.4	82.0	66.4
Stony Cr	STY00424	STY269	d	other	Valley	67	3	5/9/95	147	24	100.0	11	100.0	13.6	22.2	14.3	40.1	17.0	33.0	27.2	72.8	44.9	79.6	4.7	77.7	65.7
Stony Cr	STY00424	STY445	d	other	Valley	67	3	10/16/95	112	16	72.7	8	72.7	23.2	37.9	8.9	25.1	36.6	70.9	8.9	91.1	54.5	65.8	4.8	76.5	64.1
Stony Cr	STY00424	STY573	d	other	Valley	67	3	5/21/96	99	22	100.0	10	90.9	38.4	62.7	10.1	28.4	20.2	39.2	24.2	75.8	40.4	86.1	4.7	78.1	70.1
Stony Cr	STY00424	STY815	d	other	Valley	67	3	5/27/97	119	13	59.1	8	72.7	31.1	50.8	4.2	11.8	14.3	27.7	40.3	59.7	57.1	61.9	5.2	71.1	51.9
Stony Cr	STY00424	STY998	d	other	Valley	67	3	9/23/97	111	15	68.2	8	72.7	27.0	44.1	4.5	12.6	8.1	15.7	27.0	73.0	56.8	62.5	5.1	71.4	52.5
Stony Cr	STY00424	STY1297	d	other	Valley	67	3	10/20/98	134	17	77.3	8	72.7	29.9	48.7	7.5	20.9	26.1	50.6	15.7	84.3	48.5	74.4	5.0	73.7	62.8
Stony Cr	STY00424	STY1405	v	other	Valley	67	3	5/10/99	187	20	90.9	9	81.8	24.1	39.3	3.7	10.5	20.9	40.4	40.6	59.4	52.4	68.7	5.2	70.6	57.7
Stony Cr	STY00424	STY2753	v	other	Valley	67	3	10/18/99	126	15	68.2	7	63.6	23.0	37.6	4.8	13.4	42.1	81.5	3.2	96.8	47.6	75.7	4.8	76.5	64.2
Stony Cr	STY00424	STY2817	v	other	Valley	67	3	4/17/00	246	20	90.9	7	63.6	54.9	89.6	3.3	9.1	24.8	48.1	10.2	89.8	50.4	71.6	4.4	83.0	68.2
Stony Cr	STY00424	STY2875	v	other	Valley	67	3	11/2/00	453	20	90.9	10	90.9	28.3	46.1	6.0	16.7	12.8	24.8	42.4	57.6	57.6	61.2	4.9	75.2	58.0
Stony Cr	STY00424	STY2957	v	other	Valley	67	3	9/27/01	168	17	77.3	10	90.9	41.1	67.0	7.1	20.1	25.6	49.6	0.0	100.0	60.1	57.6	4.4	82.0	68.1
Suanee Cr	SUA00155	SUA1588	v	other	WCentral	45	3	6/11/01	101	20	90.9	8	72.7	23.8	38.8	7.9	22.2	18.8	36.5	31.7	68.3	42.6	82.9	4.7	78.0	61.3
Suanee Cr	SUA00155	SUA1633	v	other	WCentral	45	3	10/23/01	119	13	59.1	5	45.5	33.6	54.9	29.4	82.6	26.1	50.5	11.8	88.2	47.9	75.3	4.1	87.4	67.9
Swords Cr	SWD00011	SWO301	d	other	SWest	67	3	5/9/95	104	7	31.8	1	9.1	11.5	18.8	0.0	0.0	17.3	33.5	43.3	56.7	66.3	48.6	5.4	67.3	33.2

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Swords Cr	SWD00011	SWD363	d	other	SWest	67	3	11/30/95	92	11	50.0	6	54.5	8.7	14.2	33.7	94.6	29.3	56.9	12.0	88.0	47.8	75.4	4.0	87.5	65.2
Swords Cr	SWD00011	SWD773	d	other	SWest	67	3	5/21/97	103	13	59.1	7	63.6	32.0	52.3	4.9	13.6	12.6	24.5	40.8	59.2	66.0	49.1	5.0	73.3	49.4
Swords Cr	SWD00011	SWD1081	d	other	SWest	67	3	10/30/97	109	12	54.5	6	54.5	26.6	43.4	13.8	38.6	51.4	99.6	10.1	89.9	51.4	70.2	3.8	91.4	67.8
Swords Cr	SWD00011	SWD1191	d	other	SWest	67	3	6/22/98	24	6	27.3	4	36.4	58.3	95.2	0.0	0.0	29.2	56.5	8.3	91.7	75.0	36.1	4.3	84.5	53.5
Teels Cr	TEL00102	TEL11	d	other	WCentral	45	1	11/2/94	109	7	31.8	4	36.4	27.5	44.9	0.0	0.0	9.2	17.8	4.6	95.4	80.7	27.8	5.1	71.5	40.7
Teels Cr	TEL00102	TEL199	d	other	WCentral	45	1	5/18/95	154	16	72.7	7	63.6	42.9	70.0	10.4	29.2	20.1	39.0	15.6	84.4	31.2	99.4	4.3	84.4	67.8
Teels Cr	TEL00102	TEL394	d	other	WCentral	45	1	12/15/95	106	8	36.4	4	36.4	31.1	50.8	0.9	2.6	12.3	23.8	2.8	97.2	80.2	28.6	4.8	76.2	44.0
Teels Cr	TEL00102	TEL1419	v	other	WCentral	45	1	4/13/99	135	15	68.2	5	45.5	14.8	24.2	0.0	0.0	5.9	11.5	39.3	60.7	56.3	63.1	5.5	65.4	42.3
Teels Cr	TEL00102	TEL1495	v	other	WCentral	45	1	4/5/00	91	10	45.5	4	36.4	79.1	100.0	0.0	0.0	28.6	55.4	11.0	89.0	73.6	38.1	4.2	85.3	56.2
Teels Cr	TEL00102	TEL1575	v	other	WCentral	45	1	10/2/00	210	19	86.4	6	54.5	30.5	49.7	2.4	6.7	15.2	29.5	4.3	95.7	46.2	77.7	4.7	77.7	59.8
Toms Brook	TMB00054	TMB450	d	other	Valley	67	2	10/25/95	183	18	81.8	9	81.8	12.6	20.5	18.0	50.6	15.8	30.7	3.3	96.7	59.0	59.2	5.7	63.8	60.7
Toms Brook	TMB00054	TMB576	d	other	Valley	67	2	6/5/96	122	21	95.5	10	90.9	15.6	25.4	7.4	20.7	15.6	30.2	27.0	73.0	45.1	79.3	5.4	67.5	60.3
Toms Brook	TMB00054	TMB999	d	other	Valley	67	2	10/16/97	151	25	100.0	12	100.0	21.2	34.6	13.9	39.0	19.9	38.5	3.3	96.7	37.7	89.9	4.9	75.6	71.8
Toms Brook	TMB00054	TMB1431	v	other	Valley	67	2	5/10/99	126	12	54.5	6	54.5	31.7	51.8	3.2	8.9	15.1	29.2	32.5	67.5	49.2	73.4	5.1	72.7	51.6
Toms Brook	TMB00054	TMB2756	v	other	Valley	67	2	10/18/99	112	12	54.5	6	54.5	8.9	14.6	22.3	62.7	47.3	91.7	2.7	97.3	62.5	54.2	4.3	84.2	64.2
Toms Brook	TMB00054	TMB2818	v	other	Valley	67	2	4/17/00	168	15	68.2	5	45.5	29.8	48.6	1.2	3.3	14.9	28.8	19.0	81.0	47.6	75.7	5.3	69.2	52.5
Toms Brook	TMB00054	TMB2876	v	other	Valley	67	2	10/23/00	113	15	68.2	8	72.7	35.4	57.8	17.7	49.7	17.7	34.3	12.4	87.6	37.2	90.8	4.4	81.7	67.8
Toms Brook	TMB00054	TMB2958	v	other	Valley	67	2	9/27/01	101	15	68.2	7	63.6	18.8	30.7	17.8	50.0	36.6	71.0	3.0	97.0	36.6	91.5	4.4	81.9	69.3
Toms Brook	TMB00054	TMB2979	v	other	Valley	67	2	5/14/02	297	18	81.8	8	72.7	10.8	17.6	6.1	17.0	13.1	25.4	16.8	83.2	66.7	48.1	6.3	53.9	50.0
Toms Cr	TOM00219	TOM1428	v	other	WCentral	67		3/29/99	121	19	86.4	8	72.7	26.4	43.2	9.1	25.5	28.1	54.5	16.5	83.5	31.4	99.1	4.1	86.2	68.9
Toms Cr	TOM00219	TOM1459	v	other	WCentral	67		11/2/99	142	15	68.2	7	63.6	14.1	23.0	21.8	61.3	33.8	65.5	1.4	98.6	34.5	94.6	3.7	92.5	70.9
Toms Cr	TOM00219	TOM1492	v	other	WCentral	67		4/27/00	133	17	77.3	10	90.9	66.2	100.0	16.5	46.4	17.3	33.5	1.5	98.5	53.4	67.3	3.5	95.9	76.2
Toms Cr	TOM00219	TOM1549	v	other	WCentral	67		11/6/00	340	21	95.5	12	100.0	25.0	40.8	32.4	90.8	12.6	24.5	7.1	92.9	41.8	84.1	3.6	93.7	77.8
Toms Cr	TOM00219	TOM1635	v	other	WCentral	67		10/18/01	132	17	77.3	10	90.9	24.2	39.6	6.8	19.1	43.9	85.2	7.6	92.4	47.7	75.5	4.3	83.2	70.4
Turley Cr	TRL00002	TRL577	d	other	Valley	67	1	5/30/96	107	22	100.0	9	81.8	33.6	54.9	7.5	21.0	17.8	34.4	27.1	72.9	36.4	91.8	4.7	77.7	66.8
Turley Cr	TRL00002	TRL705	d	other	Valley	67	1	10/16/96	99	9	40.9	4	36.4	24.2	39.6	1.0	2.8	3.0	5.9	54.5	45.5	74.7	36.5	5.6	65.3	34.1
Turley Cr	TRL00002	TRL818	d	other	Valley	67	1	5/29/97	142	17	77.3	9	81.8	20.4	33.3	10.6	29.7	7.7	15.0	40.1	59.9	59.9	58.0	5.0	73.9	53.6
Turley Cr	TRL00002	TRL1000	d	other	Valley	67	1	10/8/97	153	12	54.5	6	54.5	29.4	48.0	13.1	36.7	13.1	25.3	6.5	93.5	62.7	53.8	4.6	78.9	55.7
Turley Cr	TRL00002	TRL1325	d	other	Valley	67	1	10/23/98	126	11	50.0	7	63.6	15.9	25.9	37.3	100.0	13.5	26.1	9.5	90.5	65.9	49.3	4.3	83.7	61.2
Turley Cr	TRL00002	TRL1421	v	other	Valley	67	1	5/19/99	176	13	59.1	7	63.6	29.0	47.3	2.8	8.0	15.3	29.7	34.7	65.3	55.1	64.8	5.1	72.4	51.3
Turley Cr	TRL00002	TRL2757	v	other	Valley	67	1	10/14/99	112	19	86.4	8	72.7	17.9	29.1	23.2	65.2	18.8	36.3	20.5	79.5	42.9	82.5	4.7	78.5	66.3
Turley Cr	TRL00002	TRL2819	v	other	Valley	67	1	5/19/00	192	13	59.1	6	54.5	12.5	20.4	1.0	2.9	6.3	12.1	53.6	46.4	76.6	33.9	5.5	65.6	36.9
Turley Cr	TRL00002	TRL2877	v	other	Valley	67	1	10/27/00	146	13	59.1	6	54.5	32.9	53.7	19.2	53.8	30.8	59.7	3.4	96.6	41.8	84.1	4.3	83.8	68.2
Turley Cr	TRL00002	TRL2959	v	other	Valley	67	1	10/2/01	107	12	54.5	7	63.6	29.0	47.3	12.1	34.1	21.5	41.7	2.8	97.2	49.5	72.9	4.7	78.3	61.2
Twittys Cr	TWT00336	TWT159	d	other	Piedmont	45	3	12/1/94	60	12	54.5	2	18.2	3.3	5.4	0.0	0.0	3.3	6.5	33.3	66.7	55.0	65.0	6.3	53.9	33.8
Twittys Cr	TWT00336	TWT317	d	other	Piedmont	45	3	6/5/95	94	9	40.9	5	45.5	25.5	41.7	0.0	0.0	8.5	16.5	42.6	57.4	61.7	55.3	5.6	65.0	40.3
Twittys Cr	TWT00336	TWT723	d	other	Piedmont	45	3	11/20/96	68	6	27.3	2	18.2	17.6	28.8	0.0	0.0	4.4	8.5	36.8	63.2	55.9	63.7	5.2	71.1	35.1
Twittys Cr	TWT00336	TWT837	d	other	Piedmont	45	3	6/2/97	72	16	72.7	5	45.5	12.5	20.4	4.2	11.7	11.1	21.5	27.8	72.2	40.3	86.3	6.3	55.1	48.2
Twittys Cr	TWT00336	TWT1128	d	other	Piedmont	45	3	11/13/97	79	11	50.0	5	45.5	21.5	35.1	0.0	0.0	2.5	4.9	15.2	84.8	46.8	76.8	5.9	60.1	44.7
Twittys Cr	TWT00640	TWT158	d	other	Piedmont	45	3	11/29/94	74	15	68.2	8	72.7	31.1	50.7	9.5	26.6	10.8	21.0	36.5	63.5	52.7	68.3	5.1	72.1	55.4
Twittys Cr	TWT00640	TWT316	d	other	Piedmont	45	3	6/6/95	70	3	13.6	1	9.1	7.1	11.7	0.0	0.0	7.1	13.8	57.1	42.9	92.9	10.3	6.6	50.4	19.0
Twittys Cr	TWT00640	TWT722	d	other	Piedmont	45	3	11/20/96	82	10	45.5	3	27.3	25.6	41.8	3.7	10.3	32.9	63.8	30.5	69.5	47.6	75.7	5.6	64.3	49.8
Twittys Cr	TWT00640	TWT836	d	other	Piedmont	45	3	6/2/97	86	14	63.6	5	45.5	12.8	20.9	2.3	6.5	17.4	33.8	38.4	61.6	52.3	68.9	6.4	53.1	44.2
Twittys Cr	TWT00640	TWT1127	d	other	Piedmont	45	3	11/13/97	111	15	68.2	8	72.7	28.8	47.1	8.1	22.8	39.6	76.8	16.2	83.8	29.7	100.0	4.5	80.4	69.0
Twittys Cr	TWT00724	TWT157	d	other	Piedmont	45	3	11/29/94	97	17	77.3	8	72.7	24.7	40.4	18.6	52.1	19.6	38.0	10.3	89.7	32.0	98.3	4.5	81.5	68.7
Twittys Cr	TWT00724	TWT315	d	other	Piedmont	45	3	6/5/95	104	14	63.6	8	72.7	11.5	18.8	18.3	51.3	22.1	42.9	35.6	64.4	45.2	79.2	4.4	82.1	59.4
Twittys Cr	TWT00724	TWT721	d	other	Piedmont	45	3	11/20/96	128	16	72.7	8	72.7	31.3	51.0	10.9	30.7	22.7	43.9	23.4	76.6	41.4	84.6	4.5	80.8	64.1
Twittys Cr	TWT00724	TWT834	d	other	Piedmont	45	3	6/2/97	105	20	90.9	7	63.6	13.3	21.8	13.3	37.4	24.8	48.0	19.0	81.0	30.5	100.0	4.3	83.8	65.8
Twittys Cr	TWT00724	TWT1126	d	other	Piedmont	45	3	11/13/97	90	14	63.6	7	63.6	28.9	47.2	14.4	40.5	53.3	100.0	16.7	83.3	34.4	94.7	4.2	85.4	72.3

Table D-2 (continued).

	Station	Sample	Data	Stream	DEQ	Eco-		Sample		RTOTAL		REPT		ZEPHM		ZPTLH		ZSCRA		ZCHIR		Z2DOM		HBI		Virginia
Name	ID	ID	Set	Type	Region	region	Order	Date	N Ind	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	Metric	Score	SCI
Tye R	TYE02067	TYE53	d	other	Valley	45	3	10/27/94	123	16	72.7	9	81.8	29.3	47.8	10.6	29.7	25.2	48.8	4.9	95.1	50.4	71.6	4.3	83.6	66.4
Tye R	TYE02067	TYE578	d	other	Valley	45	3	5/22/96	107	18	81.8	8	72.7	36.4	59.5	9.3	26.2	25.2	48.9	27.1	72.9	44.9	79.6	4.4	81.7	65.4
Tye R	TYE02067	TYE1002	d	other	Valley	45	3	10/20/97	121	17	77.3	7	63.6	25.6	41.8	4.1	11.6	19.8	38.4	10.7	89.3	62.8	53.7	5.1	71.5	55.9
Tye R	TYE02067	TYE1329	d	other	Valley	45	3	10/13/98	153	13	59.1	6	54.5	19.0	30.9	2.6	7.3	28.8	55.7	2.0	98.0	66.7	48.1	5.1	71.9	53.2
Tye R	TYE02067	TYE1397	v	other	Valley	45	3	5/12/99	139	12	54.5	7	63.6	28.8	47.0	2.9	8.1	29.5	57.2	27.3	72.7	51.8	69.6	4.7	77.2	56.2
Tye R	TYE02067	TYE2758	v	other	Valley	45	3	10/25/99	106	16	72.7	9	81.8	39.6	64.7	14.2	39.7	15.1	29.3	18.9	81.1	39.6	87.2	4.0	87.5	68.0
Tye R	TYE02067	TYE2820	v	other	Valley	45	3	4/20/00	119	12	54.5	7	63.6	72.3	100.0	4.2	11.8	5.0	9.8	8.4	91.6	65.5	49.8	4.1	86.2	58.4
Tye R	TYE02067	TYE2960	v	other	Valley	45	3	9/26/01	189	15	68.2	7	63.6	15.9	25.9	4.2	11.9	27.0	52.3	28.6	71.4	60.8	56.6	5.2	70.0	52.5
Tye R	TYE02067	TYE2961	v	other	Valley	45	3	9/26/01	190	15	68.2	8	72.7	17.9	29.2	4.7	13.3	41.1	79.6	12.1	87.9	61.6	55.5	4.8	75.9	60.3
Tye R	TYE02067	TYE6388	v	other	Valley	45	3	5/29/02	228	16	72.7	8	72.7	28.9	47.3	3.5	9.8	23.7	45.9	27.2	72.8	48.7	74.1	4.9	74.9	58.8
Wolf Cr	WLF00410	WOL365	d	other	SWest	67	4	11/5/95	107	9	40.9	6	54.5	29.0	47.3	0.9	2.6	36.4	70.6	12.1	87.9	68.2	45.9	5.2	70.0	52.5
Wolf Cr	WLF00410	WOL775	d	other	SWest	67	4	6/12/97	103	10	45.5	3	27.3	13.6	22.2	0.0	0.0	34.0	65.9	28.2	71.8	59.2	58.9	5.0	72.9	45.6
Wolf Cr	WLF00410	WLF1094	d	other	SWest	67	4	10/2/97	126	9	40.9	5	45.5	20.6	33.7	0.0	0.0	4.8	9.2	11.1	88.9	78.6	31.0	5.4	67.4	39.6
Walker Cr	WLK05085	WLK1087	d	other	SWest	67		11/18/97	139	15	68.2	8	72.7	17.3	28.2	44.6	100.0	27.3	53.0	2.9	97.1	48.2	74.8	3.2	99.6	74.2
Walker Cr	WLK05085	WLK1197	d	other	SWest	67		4/28/98	107	17	77.3	10	90.9	26.2	42.7	14.0	39.4	45.8	88.7	19.6	80.4	37.4	90.4	4.1	87.1	74.6
Willis R	WLL02461	WLL6355	v	str	SCRO			5/2/01	112	19	86.4	7	63.6	39.3	64.1	12.5	35.1	34.8	67.5	4.5	95.5	33.9	95.4	4.2	85.8	74.2
Willis R	WLL02461	WLL6356	v	str	SCRO			10/29/01	49	12	54.5	2	18.2	0.0	0.0	10.2	28.6	28.6	55.4	8.2	91.8	34.7	94.3	5.9	60.9	50.5
West Strait Cre	WSC00367	WSC273	d	other	Valley	67	1	5/11/95	100	1	4.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	10.0	0.0	13.1
West Strait Cre	WSC00367	WSC706	d	other	Valley	67	1	10/17/96	135	11	50.0	2	18.2	0.7	1.2	0.0	0.0	5.2	10.0	20.0	80.0	80.0	28.9	8.6	19.9	26.0
West Strait Cre	WSC00367	WSC1293	d	other	Valley	67	1	10/28/98	112	8	36.4	0	0.0	0.0	0.0	0.0	0.0	1.8	3.5	50.9	49.1	78.6	31.0	8.2	27.2	18.4
West Strait Cre	WSC00367	WSC1434	v	other	Valley	67	1	5/17/99	235	8	36.4	0	0.0	0.0	0.0	0.0	0.0	1.3	2.5	39.6	60.4	57.4	61.5	7.8	32.3	24.1
West Strait Cre	WSC00367	WSC2760	v	other	Valley	67	1	10/13/99	118	12	54.5	2	18.2	0.0	0.0	1.7	4.8	7.6	14.8	20.3	79.7	72.0	40.4	8.6	21.3	29.2
West Strait Cre	WSC00367	WSC2821	v	other	Valley	67	1	5/4/00	262	6	27.3	2	18.2	0.8	1.2	0.0	0.0	0.0	0.0	88.2	11.8	96.9	4.4	6.4	53.4	14.5
West Strait Cre	WSC00367	WSC2878	v	other	Valley	67	1	10/13/00	156	10	45.5	1	9.1	0.0	0.0	0.0	0.0	1.9	3.7	46.2	53.8	87.8	17.6	7.8	32.4	20.3
West Strait Cre	WSC00367	WSC2905	v	other	Valley	67	1	5/3/01	136	9	40.9	2	18.2	2.2	3.6	0.7	2.1	0.0	0.0	39.7	60.3	84.6	22.3	7.9	30.7	22.3
West Strait Cre	WSC00367	WSC2965	v	other	Valley	67	1	10/15/01	294	6	27.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.5	42.5	93.5	9.3	7.5	36.2	14.4
West Strait Cre	WSC00379	WSC272	d	other	Valley	67	1	5/11/95	141	19	86.4	12	100.0	24.8	40.5	11.3	31.9	24.8	48.1	27.0	73.0	45.4	78.9	4.8	76.6	66.9
West Strait Cre	WSC00379	WSC707	d	other	Valley	67	1	10/17/96	119	14	63.6	8	72.7	39.5	64.5	15.1	42.5	21.8	42.3	9.2	90.8	37.8	89.8	4.3	84.0	68.8
West Strait Cre	WSC00379	WSC1292	d	other	Valley	67	1	10/28/98	125	18	81.8	9	81.8	11.2	18.3	11.2	31.4	60.8	100.0	8.0	92.0	62.4	54.3	4.3	83.9	68.0
West Strait Cre	WSC00379	WSC1433	v	other	Valley	67	1	5/17/99	132	16	72.7	10	90.9	18.2	29.7	12.1	34.0	47.7	92.5	13.6	86.4	45.5	78.8	4.1	86.6	71.5
West Strait Cre	WSC00379	WSC2759	v	other	Valley	67	1	10/13/99	110	9	40.9	3	27.3	4.5	7.4	0.0	0.0	81.8	100.0	6.4	93.6	77.3	32.8	4.4	83.0	48.1
West Strait Cre	WSC00379	WSC2822	v	other	Valley	67	1	5/4/00	154	12	54.5	7	63.6	22.7	37.1	1.9	5.5	44.2	85.6	29.9	70.1	57.1	61.9	4.4	82.3	57.6
West Strait Cre	WSC00379	WSC2879	v	other	Valley	67	1	10/13/00	117	16	72.7	10	90.9	5.1	8.4	14.5	40.8	42.7	82.8	10.3	89.7	62.4	54.3	4.6	79.5	64.9
West Strait Cre	WSC00379	WSC2906	v	other	Valley	67	1	5/31/01	142	12	54.5	6	54.5	19.7	32.2	4.2	11.9	43.0	83.3	28.2	71.8	65.5	49.8	4.4	83.0	55.1
West Strait Cre	WSC00379	WSC2966	v	other	Valley	67	1	10/15/01	134	13	59.1	5	45.5	9.7	15.8	4.5	12.6	61.2	100.0	5.2	94.8	70.9	42.0	4.4	82.2	56.5
Japa's Fork	XBF00040	XBF2893	v	other	SWest	69	2	5/21/01	5	4	18.2	2	18.2	0.0	0.0	0.0	0.0	0.0	0.0	40.0	60.0	60.0	57.8	5.2	70.5	28.1
Japa's Fork	XBF00040	XBF2908	v	other	SWest	69	2	10/23/01	97	7	31.8	3	27.3	0.0	0.0	40.2	100.0	0.0	0.0	42.3	57.7	81.4	26.8	4.0	88.8	41.6
XT Hurricane B	XBL00080	XBL153	d	other	Piedmont	45	1	11/17/94	274	5	22.7	0	0.0	0.0	0.0	0.0	0.0	7.3	14.1	21.9	78.1	64.2	51.7	6.7	49.0	27.0
XT Hurricane B	XBL00080	XBL312	d	other	Piedmont	45	1	5/31/95	91	7	31.8	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.4	17.6	82.4	25.4	7.3	39.6	14.3
XT Hurricane B	XBL00080	XBL726	d	other	Piedmont	45	1	11/13/96	83	10	45.5	2	18.2	4.8	7.9	0.0	0.0	0.0	0.0	60.2	39.8	60.2	57.4	6.3	54.4	27.9
XT Hurricane B	XBL00080	XBL845	d	other	Piedmont	45	1	5/13/97	68	8	36.4	0	0.0	0.0	0.0	0.0	0.0	7.4	14.2	58.8	41.2	58.8	59.5	7.1	42.4	24.2
XT Hurricane B	XBL00080	XBL1133	d	other	Piedmont	45	1	11/19/97	91	14	63.6	4	36.4	9.9	16.1	4.4	12.3	23.1	44.7	38.5	61.5	52.7	68.3	6.1	57.6	45.1
XT Hurricane B	XBL00080	XBL1238	d	other	Piedmont	45	1	5/14/98	95	11	50.0	3	27.3	13.7	22.3	0.0	0.0	31.6	61.2	31.6	68.4	36.8	91.2	6.3	53.8	46.8
XT Hurricane B	XBL00118	XBL152	d	other	Piedmont	45	1	11/17/94	77	15	68.2	5	45.5	24.7	40.3	6.5	18.2	3.9	7.6	33.8	66.2	42.9	82.5	4.5	81.5	51.3
XT Hurricane B	XBL00118	XBL313	d	other	Piedmont	45	1	5/31/95	45	10	45.5	3	27.3	0.0	0.0	17.8	49.9	0.0	0.0	40.0	60.0	44.4	80.2	4.5	81.3	43.0
XT Hurricane B	XBL00118	XBL725	d	other	Piedmont	45	1	11/13/96	65	12	54.5	3	27.3	6.2	10.0	3.1	8.6	1.5	3.0	53.8	46.2	53.8	66.7	6.3	53.8	33.8
XT Hurricane B	XBL00118	XBL844	d	other	Piedmont	45	1	5/13/97	73	11	50.0	5	45.5	28.8	47.0	5.5	15.4	9.6	18.6	41.1	58.9	50.7	71.2	5.0	73.3	47.5
XT Hurricane B	XBL00118	XBL1132	d	other	Piedmont	45	1	11/19/97	82	15	68.2	6	54.5	22.0	35.8	13.4	37.7	25.6	49.6	24.4	75.6	34.1	95.1	4.4	82.1	62.3
XT Hurricane B	XBL00118	XBL1237	d	other	Piedmont	45	1	5/14/98	79	16	72.7	6	54.5	25.3	41.3	5.1	14.2	21.5	41.7	27.8	72.2	41.8	84.1	4.6	79.8	57.6

Table D-2 (continued).

Name	Station ID	Sample ID	Data Set	Stream Type	DEQ Region	Eco-region	Order	Sample Date	N Ind	RTOTAL Metric	RTOTAL Score	REPT Metric	REPT Score	ZEPHM Metric	ZEPHM Score	ZPTLH Metric	ZPTLH Score	ZSCRA Metric	ZSCRA Score	ZCHIR Metric	ZCHIR Score	Z2DOM Metric	Z2DOM Score	HBI Metric	HBI Score	Virginia SCI
XT Chickahomi	XDD00084	XDD149	d	str	Piedmont	45	1	11/22/94	37	3	13.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.4	21.6	97.3	3.9	7.4	38.5	9.7
XT Chickahomi	XDD00084	XDD311	d	str	Piedmont	45	1	5/1/95	51	10	45.5	1	9.1	0.0	0.0	0.0	0.0	0.0	0.0	49.0	51.0	62.7	53.8	5.6	64.5	28.0
XT Chickahomi	XDD00084	XDD716	d	str	Piedmont	45	1	10/23/96	36	5	22.7	0	0.0	0.0	0.0	0.0	0.0	38.9	75.4	27.8	72.2	66.7	48.1	7.1	42.5	32.6
XT Chickahomi	XDD00084	XDD826	d	str	Piedmont	45	1	5/19/97	48	6	27.3	0	0.0	0.0	0.0	0.0	0.0	45.8	88.8	31.3	68.8	77.1	33.1	8.0	29.1	30.9
XT Chickahomi	XDD00084	XDD1125	d	str	Piedmont	45	1	11/12/97	68	9	40.9	1	9.1	0.0	0.0	0.0	0.0	14.7	28.5	29.4	70.6	33.8	95.6	6.9	45.4	36.3
XT Chickahomi	XDD00084	XDD1250	d	str	Piedmont	45	1	5/24/98	84	10	45.5	1	9.1	0.0	0.0	0.0	0.0	6.0	11.5	41.7	58.3	57.1	61.9	6.0	58.4	30.6
XT Chickahomi	XDD00123	XDD148	d	other	Piedmont	45	1	11/22/94	15	3	13.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	73.3	38.5	7.2	41.1	24.2
XT Chickahomi	XDD00123	XDD310	d	other	Piedmont	45	1	5/1/95	34	7	31.8	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.4	67.6	70.6	42.5	5.8	61.4	25.4
XT Chickahomi	XDD00123	XDD715	d	other	Piedmont	45	1	10/23/96	14	4	18.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.7	64.3	78.6	31.0	6.6	49.3	20.3
XT Chickahomi	XDD00123	XDD825	d	other	Piedmont	45	1	5/19/97	12	5	22.7	0	0.0	0.0	0.0	0.0	0.0	25.0	48.4	16.7	83.3	58.3	60.2	7.3	39.2	31.7
XT Chickahomi	XDD00123	XDD1124	d	other	Piedmont	45	1	11/12/97	23	7	31.8	0	0.0	0.0	0.0	0.0	0.0	8.7	16.9	21.7	78.3	47.8	75.4	7.0	44.1	30.8
XT Chickahomi	XDD00123	XDD1249	d	other	Piedmont	45	1	5/24/98	5	1	4.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	8.0	29.4	16.7
Plains Mill Sprir	XDX00048	XDX566	d	other	Valley	67	1	6/5/96	109	9	40.9	1	9.1	0.9	1.5	0.0	0.0	8.3	16.0	14.7	85.3	88.1	17.2	7.3	40.2	26.3
Plains Mill Sprir	XDX00048	XDX1287	d	other	Valley	67	1	10/23/98	134	8	36.4	1	9.1	0.0	0.0	0.0	0.0	2.2	4.3	4.5	95.5	88.1	17.2	7.5	36.7	24.9
UT to S.Meherr	XEI00027	XEI6366	v	other	SCRO	45	1	5/16/01	92	10	45.5	4	36.4	22.8	37.3	0.0	0.0	19.6	37.9	34.8	65.2	54.3	65.9	4.2	85.0	46.6
UT to Nottoway	XEJ00173	XEJ6358	v	other	Piedmont	45	1	4/9/01	74	13	59.1	3	27.3	5.4	8.8	1.4	3.8	9.5	18.3	41.9	58.1	58.1	60.5	6.1	57.0	36.6
UT to Nottoway	XEJ00173	XEJ6359	v	other	Piedmont	45	1	10/30/01	109	13	59.1	2	18.2	3.7	6.0	0.0	0.0	28.4	55.1	4.6	95.4	57.8	61.0	5.2	70.0	45.6
UT to Elmwood	XEX00081	XEX6372	v	other	Piedmont		1	3/22/01	114	11	50.0	3	27.3	5.3	8.6	0.9	2.5	0.0	0.0	9.6	90.4	64.9	50.7	6.2	55.8	35.7
XT Deep Cr	XGP00180	XGP146	d	str	Piedmont	45	1	11/28/94	100	2	9.1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.0	30.0	100.0	0.0	9.3	10.3	6.2
XT Deep Cr	XGP00180	XGP322	d	str	Piedmont	45	1	5/30/95	105	5	22.7	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.4	28.6	81.0	27.5	8.7	19.6	12.3
XT Deep Cr	XGP00180	XGP714	d	str	Piedmont	45	1	11/18/96	40	3	13.6	0	0.0	0.0	0.0	0.0	0.0	25.0	48.4	62.5	37.5	87.5	18.1	8.6	20.2	17.2
XT Deep Cr	XGP00180	XGP843	d	str	Piedmont	45	1	5/29/97	68	5	22.7	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	73.5	26.5	73.5	38.2	7.1	42.4	16.2
XT Deep Cr	XGP00180	XGP1123	d	str	Piedmont	45	1	11/11/97	67	8	36.4	1	9.1	0.0	0.0	0.0	0.0	29.9	57.9	44.8	55.2	52.2	69.0	7.4	38.6	33.3
XT Deep Cr	XGP00180	XGP1252	d	str	Piedmont	45	1	5/25/98	72	6	27.3	0	0.0	0.0	0.0	0.0	0.0	16.7	32.3	55.6	44.4	55.6	64.2	7.0	43.7	26.5
XT Deep Cr	XGP00220	XGP147	d	other	Piedmont	45	1	11/28/94	51	13	59.1	3	27.3	5.9	9.6	0.0	0.0	2.0	3.8	39.2	60.8	51.0	70.8	5.5	65.4	37.1
XT Deep Cr	XGP00220	XGP321	d	other	Piedmont	45	1	5/30/95	55	4	18.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	72.7	27.3	72.7	39.4	5.8	61.5	18.3
XT Deep Cr	XGP00220	XGP712	d	other	Piedmont	45	1	10/23/96	37	6	27.3	0	0.0	0.0	0.0	0.0	0.0	37.8	73.3	27.0	73.0	64.9	50.8	7.0	43.7	33.5
XT Deep Cr	XGP00220	XGP713	d	other	Piedmont	45	1	11/18/96	37	2	9.1	0	0.0	0.0	0.0	0.0	0.0	32.4	62.9	67.6	32.4	100.0	0.0	6.6	49.2	19.2
XT Deep Cr	XGP00220	XGP842	d	other	Piedmont	45	1	5/29/97	42	14	63.6	3	27.3	11.9	19.4	0.0	0.0	14.3	27.7	33.3	66.7	38.1	89.4	6.3	54.6	43.6
XT Deep Cr	XGP00220	XGP1122	d	other	Piedmont	45	1	11/11/97	69	14	63.6	3	27.3	7.2	11.8	4.3	12.2	33.3	64.6	26.1	73.9	37.7	90.0	6.2	55.2	49.8
XT Deep Cr	XGP00220	XGP1251	d	other	Piedmont	45	1	5/25/98	59	8	36.4	3	27.3	15.3	24.9	10.2	28.5	32.2	62.4	50.8	49.2	62.7	53.9	5.9	59.5	42.8
UT to Hyco R	XMF00146	XMF6369	v	other	SCRO	45	1	5/15/01	73	11	50.0	4	36.4	6.8	11.2	15.1	42.3	4.1	8.0	28.8	71.2	46.6	77.2	5.0	73.7	46.2
XT Moores Cr	XRC00115	XRC6381	v	str	Valley	64	1	4/29/02	186	10	45.5	2	18.2	22.0	36.0	0.0	0.0	14.5	28.1	38.7	61.3	60.8	56.7	6.2	56.5	37.8
UT of Back Cr	XXB00063	XXB2824	v	other	Valley	67	1	5/2/00	144	13	59.1	8	72.7	11.1	18.1	0.0	0.0	9.0	17.5	59.7	40.3	70.8	42.1	5.1	71.5	40.2

APPENDIX E

COMPARISONS OF METHODS AND METRICS AMONG SEVERAL STUDIES RELATED TO BIOMONITORING IN VIRGINIA

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The tables on the following pages summarize and compare information from several studies related to biomonitoring in Virginia and nearby states. Table E-1compares methods as reported in the various study reports, and Table E-2 compares biological metrics and/or multimetric index development as reported in the same study reports.

Table E-1. Methods comparisons among studies related to Virginia biomonitoring

Study Characteristics	WV-SCI 2000[a]	S&V 1997[b]	S&G 1997[c]	VCU MS 1997[d]	MACS - CPMI 2000[e]	MBSS[f]	J&K 1997[g]
Location	WV	Mid-Atlantic Highlands (PA, MD, WV, VA)	VA, Rockingham Co.	VA	coastal plain of NJ, DE, MD, VA, NC, SC	MD	VA, Prince William Co.
# Sites (benthic)	1268	450 samples (some at same sites on different dates)	8	68	106	755	33
# Samples per Site	1	various	6	2		one	one
Sampling Period	1996-1998		Fall 1994 – Fall 1997	Spring 1994 – Spring 1995	Fall 1995	Spring only 1994 – 1997	Summer 1996
Level III Ecoregions	67, 69, 70	67 & 69 best results; possible application to 66 & 70	67	45, 65	63, 65	63, 64, 65, 66, 67, 69	64, 65?
Reference Site Classification	one	yes	no	yes, 4	yes, 3	yes, 2	one
Habitat Assessment Method(s)	RBP modified	multi-agency	RBP modified	RBP modified	MACS	MBSS	RBP 1989
Benthic Habitats Sampled	riffles	riffles in wadeable streams	riffles, +glide when riffles lacking	Leaf, sediment, snags	snags, bank margins, macrophytes	multi-habitat, preferential in riffles	riffle-run
Equipment	kick net (square or D-frame)	open-net (D-frame kick net or kick screen)	D-frame, 425um mesh	D-frame, 425um mesh, +hand washing	D-frame dip net, 650-750um mesh	D-net, 600um mesh	kick net, 0.5mm mesh
Benthic Sampling Procedure	RBP	various agencies	Kick, + hand-rub larger cobble	semi-quantitative	MACS	MBSS	RBPII modified
# Sweeps, or area sampled	~2m^2				20 sweeps, ~6m^2	20 sq. ft.	
Composited?	yes	most	yes	within each habitat type	yes	yes	yes
Target Subsample	100, 200	various sizes	1st 100 random	100	100	100	200
Taxonomic Level	Family	Family	mostly Genus	Genus, Family	Genus	mostly Genus	Family

(a) Gerritsen et al. 2000; (b) Smith & Voshell 1997; (c) Smock & Garman 1997; (d) Marques 1998; (e) Maxted et al. 2000; (f) Stribling et al. 1998; (g) Jones and Kelso 1997

Table E-1 (continued).

Study Characteristics	Quantico 2001[h]	Page Brook 2002[i]	Bull Run 2000[j]	GMU MS 2001[k]			Boschen et al. 2001[l]	THIS REPORT (based on BIOMON 1994-1998)
				PWW	DEQ	EMAP		
Location	VA, Quantico Marine Corps Base	VA, Clarke Co.	VA, Prince William and Fairfax Cos.	VA, Prince William Co.	VA noncoastal	noncoastal MD, PA, VA, WV	VA, Rockingham Co.	VA noncoastal
# Sites (benthic)	13	8	31		51	102		938 samples in 278 sites
# Samples per Site	2	4	1-2		various		various	1-10
Sampling Period	1998–1999 May–July	1996–1998	1998–1999 May–June	1994–1997 Spring only	1994–1998 March–July	1993–1996 April–June	1994–1998	1994–1998
Level III Ecoregions	64	67	64	64, 65?	mostly 64, 67	various	67	45, 64, 66, 67, 69
Reference Site Classification	one						one	one
Habitat Assessment Method(s)	RBP 1989	RBP 1989	Combination RBP, RSAT, Montgomery Co. MD		RBP modified	EMAP-MAHA	RBP modified	RBP modified
Benthic Habitats Sampled	riffle-run	riffle-run	riffle-run	riffle-run	riffle-run	riffle	riffle-run	riffle-run
Equipment	kick net, 0.5mm mesh	kick net, 0.5mm mesh	kick net, 0.5mm mesh	kick net, 0.5mm mesh		kick net, 595um		
Benthic Sampling Procedure	RBPII modified	RBPII modified	RBPII modified	RBPII modified	RBP modified	EMAP-MAHA	RBP modified	RBP modified
# Sweeps, or area sampled								
Composited?	yes	yes	yes	yes	yes		yes	yes
Target Subsample	200	200	200	200	100-200		100-200	100-200
Taxonomic Level	Family	Family	Family	Family	Family	Family (most)	Family	Family

(h) Kelso et al. 2001; (i) Jones et al. 2002; (j) Jones and Arciszewski 2000; (k) Long 2001; (l) Boschen et al. 2001

Table E-2. Metrics comparisons among studies related to Virginia biomonitoring

Metrics	WV SCI[a]	S&V MM1[b]	S&V MM5[b]	S&V MM8[b]	S&V MM10[b] recommended	S&V MM11[b] recommended	S&G[c]	VCU MS[d]	MACS-CPMI[e]	MBSS Coastal[f]	MBSS non-coastal[f]
Total taxa	X						X	X	X	X	X
EPT taxa	X	X	X	X	X	X	X	X	X	X	X
EPT taxa less Hydropsychidae											
Ephemeroptera taxa					X	X		X			X
Plecoptera taxa			X					X			
Trichoptera taxa								X			
Diptera taxa											X
%EPT	X				X			X			
%E+P							X				
%Ephemeroptera		X	X	X	X	X			X	X	X
%Plecoptera											
%Trichoptera											
%EPT less Hydropsychidae											
%Plec+Tric less Hydropsychidae											
%Tric less Hydropsychidae											
%Tric as Hydropsychidae											
%Diptera								X			
%Chironomidae	X						X				
%Coleoptera											
EPT:Chironomidae ratio											
EPT:Isopod ratio											
%Tanytarsini											X
%Tanytarsini of Chironomidae										X	
%Collector								X			X
%Filterer								X			
%Predator								X			
%Shredder								X			
%Scraper		X	X	X	X	X		X			
Scraper taxa										X	
Scrapers:Filterers ratio											
% Dominant taxon							X				
% Top 2 Dominant taxa	X										
% Top 5 Dominant taxa					X	X					
Simpson Diversity Index				X	X	X					
Community Similarity Index											
Community Loss Index							X				
Sorensen Similarity Index											
Intolerant Taxa		X	X	X	X	X					X
% Tolerant individuals											X
Hilsenhoff Biotic Index	X(family)				X	X	X	X	X		
Becks Biotic Index										X	
%Clingers									X	X	
Clinger taxa											
% Haptobenthos		X		X	X	X					
TOTAL # METRICS USED	6	5	5	6	10	9	7	13	5	7	9
Multimetric Index used?	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes

(a) Gerritsen et al. 2000; (b) Smith & Voshell 1997; (c) Smock & Garman 1997; (d) Marques 1998; (e) Maxted et al. 2000; (f) Stribling et al. 1998

Table E-2 (continued).

Metrics	J&K[g]	Quantico[h]	Page Brook[i]	Bull Run[j]	GMU MS[k]			Boschen[l]	1989 RBP[m]	THIS REPORT
					PWW	DEQ	EMAP			
Total taxa	X	X	X	X	X		X	X	X	X
EPT taxa	X	X	X	X	X	X	X		X	
EPT taxa less Hydropsychidae								X		X
Ephemeroptera taxa										
Plecoptera taxa					X	X	X			
Trichoptera taxa					X					
Diptera taxa										
%EPT						X		X		
%E+P										
%Ephemeroptera						X		X		X
%Plecoptera					X	X				
%Trichoptera							X			
%EPT less Hydropsychidae				X	X	X	X			
%Plec+Tric less Hydropsychidae										X
%Tric less Hydropsychidae				X						
%Tric as Hydropsychidae					X					
%Diptera						X				
%Chironomidae						X				X
%Coleoptera				X						
EPT:Chironomidae ratio	X	X	X			X	X		X	
EPT:Isopod ratio			X							
%Tanytarsini										
%Tanytarsini of Chironomidae										
%Collector										
%Filterer										
%Predator				X	X	X				
%Shredder				X	X	X			X	
%Scraper								X		X
Scraper taxa										
Scrapers:Filterers ratio									X	
% Dominant taxon	X	X	X	X				X	X	X
% Top 2 Dominant taxa					X					
% Top 5 Dominant taxa										
Simpson Diversity Index										
Community Similarity Index									X	
Community Loss Index										
Sorensen Similarity Index	X	X	X							
Intolerant Taxa					X		X			
% Tolerant individuals						X		X		
Hilsenhoff Biotic Index	X(family)	X(family)	X(family)	X(family)		X(family)		X(family)	X(family)	X(family)
Becks Biotic Index										
%Clingers				X		X				
Clinger taxa					X					
% Haptobenthos										
TOTAL # METRICS USED	6	6	7	10	12	14	7	8	8	8
Multimetric Index used?	yes	yes	yes	yes	no	no	no	yes	yes	yes

(g) Jones and Kelso 1997; (h) Kelso et al. 2001; (i) Jones et al. 2002; (j) Jones and Arciszewski 2000; (k) Long 2001; (l) Boschen et al. 2001; (m) Plafkin et al. 1989