**EPA FINALIZED TMDL**

# Tyger River Basin (Hydrological Unit Code: 03050107); Stations: B-005, B-008, B-012, B-014, B-018A, B-019, B-020, B-021, B-051, B-067A, B-067B, B-164, B-199, B-219, B-235, B-263, B-286, B-287, B-315, B-317, B-321, B-332, B-336, BF-007, BF-008 Fecal Coliform Bacteria


D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control
Bureau of Water
2600 Bull Street
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September 29, 2004

In compliance with the provisions of the Federal Clean Water Act, 33 U.S.C §1251 et.seq., as amended by the Water Quality Act of 1987, P.L. 400-4, the U.S Environmental Protection Agency is hereby establishing a Total Maximum Daily Load (TMDL) for fecal coliform bacteria in the Tyger Basin. Subsequent actions must be consistent with this TMDL.

____________________________________ __________

James D. Giattina, Director Date
Water Management Division

# Abstract

The Tyger River Basin (8-digit HUC 03050107) is located in parts of Greenville, Newberry, Spartanburg, and Union counties in the Broad River Basin (Figure 1-1). Twenty-five water quality monitoring stations in the watershed have been placed on the South Carolina §303(d) list of impaired waters for violations of the fecal coliform bacteria standard, as shown in Table 1-1. The 820 square mile basin is composed of mostly forested land (70%) with some cropland (11%) and pastureland (10%). Unincorporated Spartanburg and Greenville counties and several towns and cities in the watershed have or will have Municipal Separate Storm Sewer (MS4) permits. There are also 21 active continuous point sources discharging fecal coliform bacteria in the Tyger River basin of South Carolina.

The load-duration curve methodology was used to establish allowable fecal coliform loads in the watershed. The existing load was determined using measured data from the impaired water quality monitoring stations. Loads were established from measured concentrations and a power trend line was fit to samples violating the instantaneous standard. The existing load and allowable total maximum daily load for impaired stations is presented in Table I. To achieve the TMDL target, reductions of fecal coliform loads will be necessary (Table I).

Table I Total Maximum Daily Loads for Impaired Water Quality Stations in the Tyger River Basin (03050107)

| Station ID | Existing Waste Load | TMDL WLA | | Existing Load | TMDL LA | MOS | TMDL[3] | Percent Reduction[4] |
|---|---|---|---|---|---|---|---|---|
| | Continuous (counts/day) | Continuous[1] (counts/day) | MS4[2] | (counts/day) | (counts/day) | (counts/day) | (counts/day) | |
| **B-005** | 7.16E+10 | 7.16E+10 | 83% | 5.47E+12 | 8.05E+11 | 4.87E+10 | 9.25E+11 | 83% |
| **B-008** | 1.78E+11 | 1.78E+11 | NA | 7.86E+12 | 3.17E+12 | 1.86E+11 | 3.53E+12 | 55% |
| **B-012** | 7.42E+10 | 7.42E+10 | 40% | 1.23E+12 | 6.21E+11 | 3.86E+10 | 7.33E+11 | 40% |
| **B-014** | 7.42E+10 | 7.42E+10 | 63% | 2.24E+12 | 7.11E+11 | 4.36E+10 | 8.29E+11 | 63% |
| **B-018A** | 9.09E+10 | 9.09E+10 | NA | 6.98E+12 | 1.55E+12 | 9.10E+10 | 1.73E+12 | 75% |
| **B-019** | NA | NA | NA | 2.32E+11 | 3.96E+10 | 2.20E+09 | 4.18E+10 | 82% |
| **B-020** | NA | NA | 73% | 5.09E+12 | 1.82E+11 | 1.01E+10 | 1.92E+11 | 73% |
| **B-021** | 1.54E+11 | 1.54E+11 | 73% | 1.93E+12 | 3.36E+11 | 2.72E+10 | 5.17E+11 | 73% |
| **B-051** | 4.38E+11 | 4.38E+11 | NA | 1.53E+13 | 6.40E+12 | 3.80E+11 | 7.22E+12 | 53% |
| **B-067A** | NA | NA | NA | 3.00E+11 | 6.16E+10 | 3.42E+09 | 6.50E+10 | 78% |
| **B-067B** | NA | NA | NA | 2.14E+11 | 5.34E+10 | 2.97E+09 | 5.64E+10 | 74% |
| **B-164** | NA | NA | 83% | 1.41E+12 | 2.30E+11 | 1.28E+10 | 2.42E+11 | 83% |
| **B-199** | 3.79E+09 | 3.79E+09 | NA | 7.35E+10 | 3.39E+10 | 2.09E+09 | 3.97E+10 | 46% |
| **B-219** | 7.57E+08 | 7.57E+08 | 46% | 6.49E+11 | 3.29E+11 | 1.83E+10 | 3.48E+11 | 46% |
| **B-235** | NA | NA | 64% | 1.32E+11 | 4.56E+10 | 2.53E+09 | 4.81E+10 | 64% |
| **B-263** | 3.48E+09 | 3.48E+09 | 13% | 8.78E+11 | 7.21E+11 | 4.03E+10 | 7.65E+11 | 13% |
| **B-286** | NA | NA | NA | 8.66E+10 | 3.33E+10 | 1.85E+09 | 3.52E+10 | 59% |
| **B-287** | 5.30E+09 | 5.30E+09 | NA | 5.64E+10 | 3.94E+10 | 2.48E+09 | 4.72E+10 | 16% |
| **B-315** | NA | NA | 52% | 3.96E+11 | 1.79E+11 | 9.94E+09 | 1.89E+11 | 52% |
| **B-317** | NA | NA | NA | 1.21E+11 | 7.90E+10 | 4.39E+09 | 8.33E+10 | 31% |
| **B-321** | NA | NA | 73% | 2.21E+10 | 5.66E+09 | 3.15E+08 | 5.98E+09 | 73% |
| **B-332** | 8.74E+10 | 8.74E+10 | NA | 2.14E+12 | 1.28E+12 | 7.58E+10 | 1.44E+12 | 33% |
| **B-336** | 5.30E+09 | 5.30E+09 | NA | 1.78E+11 | 1.16E+11 | 6.75E+09 | 1.28E+11 | 28% |
| **BF-007** | 1.54E+11 | 1.54E+11 | NA | 5.91E+11 | 1.11E+11 | 1.47E+10 | 2.79E+11 | 53% |
| **BF-008** | 2.49E+11 | 2.49E+11 | NA | 1.16E+12 | 2.12E+11 | 2.56E+10 | 4.87E+11 | 58% |

Table Notes:
1. Total monthly wasteload (#/30 days) cannot exceed loads listed in Table 3-3.
2. MS4 expressed as percent reduction equal to LA reduction.
3. TMDLs expressed as monthly load (#/30 days) by station are listed in Table B-1.
4. Percent reduction applies to LA and MS4 components when an MS4 is in the watershed.

# Table of Contents

## Figures

## Tables

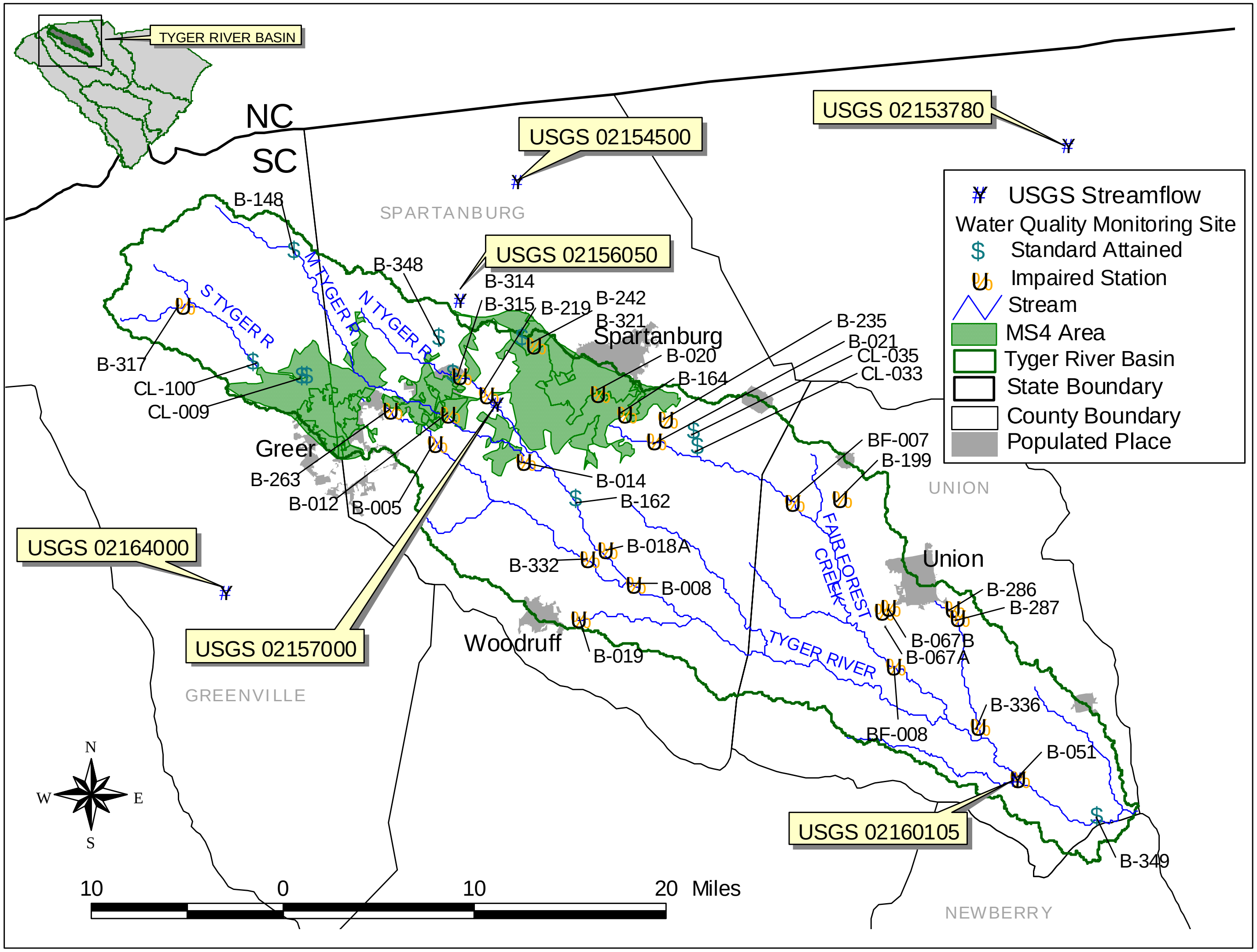


Figure 1-1 Tyger River Basin (03050107)

# 1.0 INTRODUCTION

## *1.1 Background*

Levels of fecal coliform bacteria can be elevated in waterbodies as the result of both point and nonpoint sources of pollution. Section §303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop total maximum daily loads (TMDLs) for waterbodies that are not meeting designated uses under technology-based pollution controls. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a waterbody based on the relationship between pollution sources and instream water quality conditions so that states can establish water quality-based controls to reduce pollution and restore and maintain the quality of water resources (USEPA, 1991).

The State of South Carolina has placed 25 monitoring stations in the Tyger River basin (8-digit HUC 03050107) on South Carolina's 2002 Section §303(d) list for impairment due to fecal coliform bacteria. These stations are identified in Table 1-1.

Table 1-1 Water Quality Monitoring Stations Impaired by Fecal Coliform in the Tyger River Watershed (03050107)

| Waterbody Name | Waterbody ID | Waterbody Location |
|---|---|---|
| S Tyger Rvr | B-005 | SOUTH TYGER RIVER AT S-42-63 |
| Tyger Rvr | B-008 | TYGER RIVER AT S-42-50 E. WOODRUFF |
| Middle Tyger Rvr | B-012 | MIDDLE TYGER RIVER AT S-42-63 |
| Middle Tyger Rvr | B-014 | MIDDLE TYGER RIVER AT S-42-64 |
| N Tyger Rvr | B-018A | NORTH TYGER RIVER AT S-42-231, 11 MI S OF SPARTANBURG |
| Jimmies Ck | B-019 | JIMMIES CREEK AT S-42-201 2 MI E OF WOODRUFF |
| Fairforest Ck | B-020 | FAIRFOREST CREEK AT US 221 S OF SPARTANBURG |
| Fairforest Ck | B-021 | FAIRFOREST CREEK AT SC 56 |
| Tyger Rvr | B-051 | TYGER RIVER AT SC 72 5.5 MI SW OF CARLISLE |
| Toschs Ck | B-067A | TOSCHS CREEK AT US 176 2 MI SW OF UNION |
| Toschs Ck | B-067B | TOSCHS CREEK AT RD TO WWTP OFF HWY S-44-92 SW OF UNION |
| Fairforest Ck | B-164 | FAIRFOREST CREEK AT S-42-651 3.5 MI SSE OF SPARTANBURG |
| Mitchell Ck | B-199 | MITCHELL CREEK AT CO RD 233 2.3 MI SSW OF JONESVILLE |
| N Tyger Rvr | B-219 | NORTH TYGER RIVER AT US 29 7.2 MI W OF SPARTANBURG |
| Kelsey Ck | B-235 | KELSEY CREEK AT S-42-321 |
| S Tyger Rvr | B-263 | SOUTH TYGER RIVER AT SC 290 3.7 MI E OF GREER |
| Tinker Ck | B-286 | TINKER CREEK AT RD TO STP 1.3 MI SSE OF UNION |
| Tinker Ck | B-287 | TINKER CREEK AT UN# CO RD 1.7 MI SSE OF UNION |
| Tributary to N Tyger | B-315 | TRIB TO NORTH TYGER RIVER AT UN# RD BL JACKSON #2 EFF |
| Mush Ck | B-317 | MUSH CREEK AT SC 253 BL TIGERVILLE |
| Trib to Fairforest | B-321 | TRIB TO FAIRFOREST CREEK 200 FT BL S-42-65 |
| S Tyger Rvr | B-332 | SOUTH TYGER RIVER AT S-42-86, 5 MI NE OF WOODRUFF |
| Tinker Ck | B-336 | TINKER CREEK AT S-44-278, 9 MI SSE OF UNION |
| Fairforest Ck | BF-007 | FAIRFOREST CREEK ON CO RD 12 SW OF JONESVILLE |
| Fairforest Ck | BF-008 | FAIRFOREST CREEK AT S-44-16 SW OF UNION |

## *1.2 Watershed Description*

The Tyger River basin (8-digit HUC 03050107) (Figure 1-1) is located in the Piedmont region of South Carolina. It drains 820 square miles, encompassing portions of Greenville, Newberry, Spartanburg, and Union counties. The North, Middle, and South Tyger River segments drain the upstream region (11-digit HUCs 03050107-010, -020, -030, and –040). The North and Middle branches converge nine miles to the east-southeast of Duncan, and continue on to confluence with the South Tyger River ten miles downstream. Six miles south of Union, the main stem of the Tyger River flows to its confluence with Fairforest Creek, (11-digit HUC 03050107-060) draining the Spartanburg region. The Tyger River ultimately drains into the Lower Broad River (03050106) near Shelton, South Carolina.

Based on 1996 USGS Multi-Resolution Land Characteristic (MRLC) land use data, 70 percent of the watershed is forested. The remaining 30 percent is composed of cropland (11%), pastureland (10%), urban area (6%), and a small mix of water and barren land uses (3%). Table 1-2 presents the percentage of total watershed area for each aggregated land use. The percentage of land use area in each monitoring station drainage area is presented in Appendix A (Table A-1) and the actual areas in square miles are presented in Table A-2. Figure 1-2 illustrates land use activities in the basin. Much of the forested land is abandoned agricultural land comprised of scrubby hardwoods or pine tree farms. The majority of urban land is located in the upper to middle portion of the basin along the southwestern ridgeline near Greer and along the northeastern ridgeline near Spartanburg.

Table 1-2 MRLC Aggregated Land Use for the Tyger River Basin (03050107)

| Aggregated Land Use | Percent of Total Area | Total Area ($miles^2$) |
|---|---|---|
| Urban | 6.4% | 52.5 |
| Barren | 2.1% | 17.5 |
| Row Crops | 10.8% | 88.7 |
| Pasture | 9.6% | 78.8 |
| Forest | 70.3% | 576 |
| Water | 0.7% | 6.0 |

### *1.3 Water Quality Standard*

The impaired stream segments of the Tyger River basin are designated as Class Freshwater. Waters of this class are described as:

"Freshwaters suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses." (R.61-68)

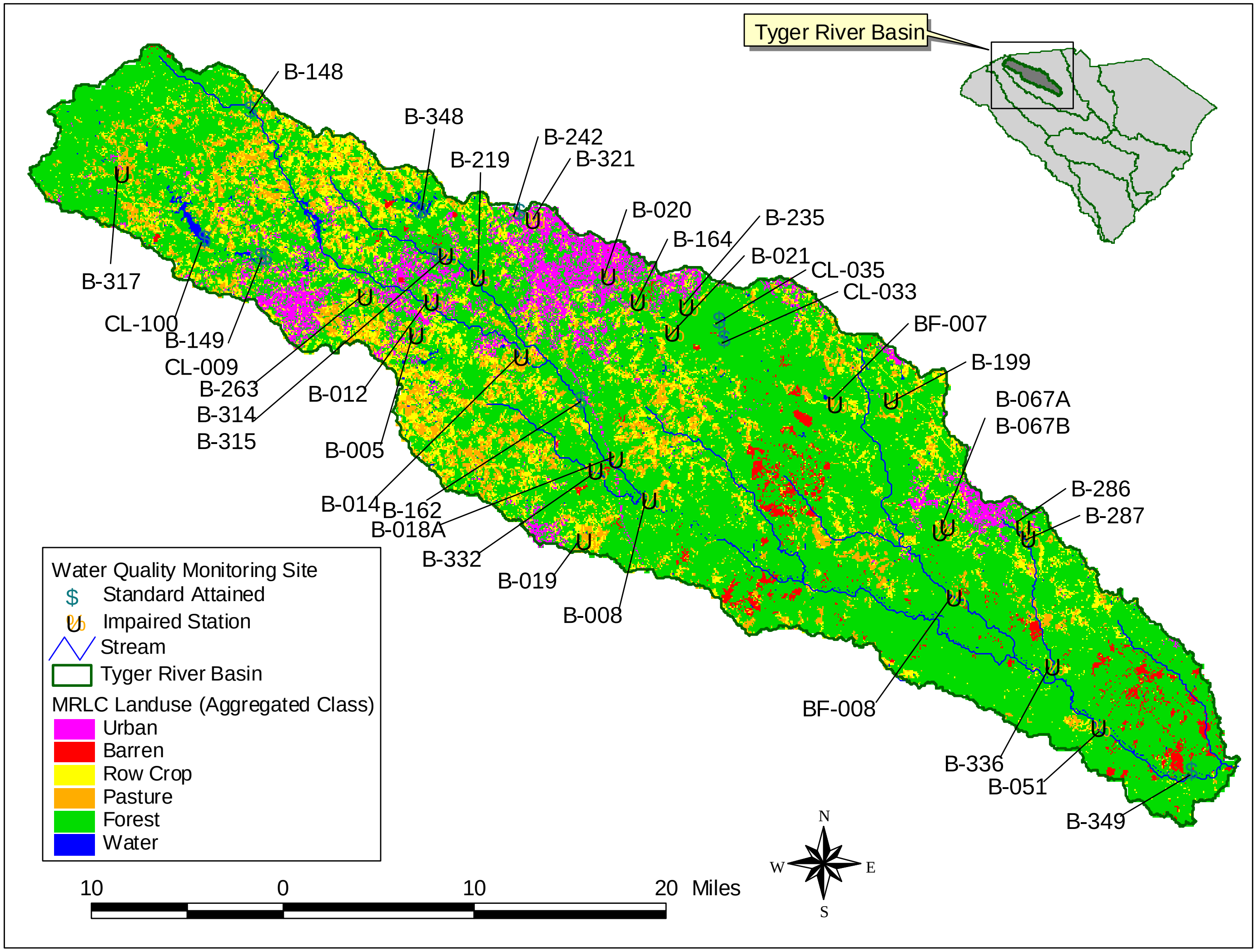


Figure 1-2 Tyger River Basin Land Use

South Carolina's standard for fecal coliform bacteria in freshwater is:

> "Not to exceed a geometric mean of 200/100 mL, based on five consecutive samples during any 30 day period; nor shall more than 10 percent of the total samples during any 30 day period exceed 400/100 mL." (R.61-68).

## 2.0 WATER QUALITY ASSESSMENT

Fecal coliform bacteria data collected in the Tyger River basin from 1990 through 2001 were assessed to determine impairment of standards for recreational use. The State of South Carolina monitors fecal coliform bacteria at 36 stations in the watershed. Figure 1-1 shows the location of water quality monitoring stations in the watershed.

Twenty-five water quality monitoring stations in the basin have been identified on the State of South Carolina's Section §303(d) list for 2002 as impaired (Table 1-1). Table 2-1 presents the statistical information supporting the listing of impaired water quality monitoring sites in the watershed. Waters in which no more than 10 percent of the samples collected over a five year period are greater than 400 fecal coliform counts per 100 mL are considered to comply with the South Carolina water quality standard for fecal

Table 2-1 Statistical Assessment of Observed Fecal Coliform Bacteria Collected from 1996 through 2000

| Station | Total Number of Samples | Total Number of Samples >400 #/100 mL | Percent of Samples >400 #/100 mL |
|---|---|---|---|
| B-005 | 29 | 10 | 34% |
| B-008 | 59 | 18 | 31% |
| B-012 | 29 | 14 | 48% |
| B-014 | 12 | 2 | 17% |
| B-018A | 36 | 17 | 47% |
| B-019 | 30 | 22 | 73% |
| B-020 | 29 | 29 | 100% |
| B-021 | 60 | 32 | 53% |
| B-051 | 58 | 22 | 38% |
| B-067A | 27 | 11 | 41% |
| B-067B | 27 | 16 | 59% |
| B-164 | 29 | 15 | 52% |
| B-199 | 26 | 21 | 81% |
| B-219 | 35 | 6 | 17% |
| B-235 | 30 | 11 | 37% |
| B-263 | 29 | 4 | 14% |
| B-286 | 26 | 11 | 42% |
| B-287 | 26 | 13 | 50% |
| B-315 | 16 | 13 | 81% |
| B-317 | 58 | 17 | 29% |
| B-321 | 57 | 25 | 44% |
| B-332 | 12 | 3 | 25% |
| B-336 | 13 | 9 | 69% |
| BF-007 | 25 | 7 | 28% |
| BF-008 | 32 | 11 | 34% |

coliform bacteria. Waters with more than 10 percent of samples greater than 400 counts per 100 mL are considered impaired and were listed for fecal coliform bacteria on the State of South Carolina's Section §303(d) list. The fecal coliform bacteria data collected at impaired water quality monitoring stations is presented in Appendix A (Table A-3).

The timeframe, both annually and seasonally, of water quality monitoring at each station varies greatly. The statistical assessment presented in Table 2-1 was based on data collected over the five-year period from 1996 through 2000.

After determining compliance with water quality standards, observed violations were assessed to determine conditions critical to impairment. Data were compared with estimated streamflows to establish a relationship between instream concentrations and hydrologic conditions. Due to limited streamflow data in the watershed, observed data were plotted with the load-duration curves generated based on area-weighted flows. The development of load-duration curves is discussed further in Section 4.0 of this report. Load-duration curves plotted for each station in Figures B-1 through B-25, and in Figure 2-1 (for B-051) are equal to the TMDL target based on the criteria for instantaneous events. The observed fecal coliform bacteria data were also converted from counts per 100 mL to loads in counts per day to assess hydrologic conditions when the standard is not attained.

The percent of flow exceeded in Figure 2-1 and Figures B-1 through B-25 represent flow conditions at each monitoring station. Hydrologic conditions for very dry events, likely to be exceeded in 99.99 percent of measured events, are represented as 99.99 percent. Extremely wet events that occur rarely are represented as 0.01 percent. Data collected at all impaired stations in the basin have violations during all flow conditions. Violations during various flow events suggest both overland, instream, and continuous sources, such as groundwater, of fecal coliform bacteria.

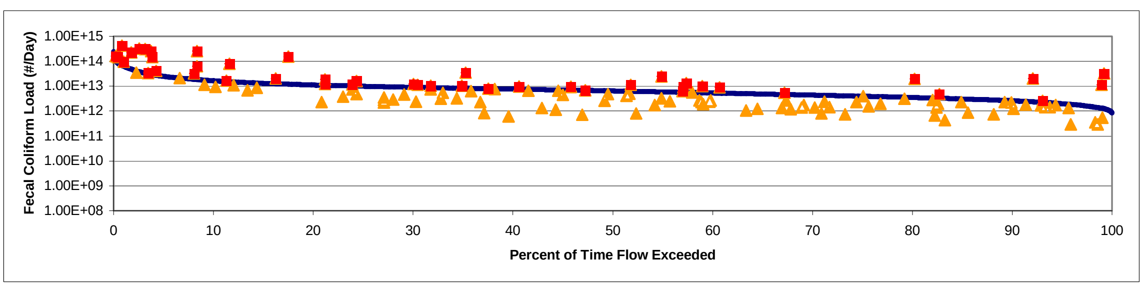


Figure 2-1 Fecal Coliform Bacteria Load-Duration Curve for Station B-051 Illustrating Observed Fecal Coliform Bacteria Loads Over Various Hydrologic Conditions

Though monitoring station B-332 (Appendix B, Figure B-12) has violations at both high and low flow conditions, the limited number of violating samples illustrates more significant violations during extreme low flow conditions. These violations are reflective of direct inputs to the system from wildlife and/or cattle in the stream or failing septic systems. This station is greatly contrasted by B-020 (Appendix B, Figure B-17), located in the MS4 area of Spartanburg. Every sample collected between 1996 and 2000 is in violation of the water quality instantaneous criteria.

# 3.0 SOURCE ASSESSMENT AND LOAD ALLOCATION

Fecal coliform bacteria enter surface waters of the Tyger River basin from both point and nonpoint sources. Point sources are facilities that discharge at a specific location through pipes, outfalls, and/or conveyance channels. All point sources must have a National Pollutant Discharge Elimination System (NPDES) permit and are often municipal wastewater treatment plants or industrial waste treatment facilities. Nonpoint sources are diffuse sources that have multiple routes of entry into surface waters. Some nonpoint sources are related to land use activities that accumulate fecal coliform bacteria on the land surface (i.e. pastureland) and runoff during storm events.

## *3.1 Point Sources*

### 3.1.1 Continuous Point Sources

Facilities with continuous discharges of fecal coliform bacteria are listed in Table 3-1 and illustrated in Figure 3-1. In South Carolina, NPDES permittees that discharge sanitary wastewater must meet the State criteria for fecal coliform bacteria at the point of discharge (i.e. a daily maximum concentration of 400 counts per 100 mL, and a 30-day geometric mean of 200 counts per 100 mL).

The TMDLs presented in this report were developed using permitted flows (or design flows when there is no limit permitted flow) and permitted concentrations for fecal coliform bacteria. Limited information was available to determine the survival rate of fecal coliform bacteria discharging from permitted facilities to establish the impact downstream. Therefore, for the purpose of fecal coliform bacteria TMDL development in the Tyger River basin, wasteloads for continuous discharges are cumulative for a given drainage area. Estimated existing loads and the permitted geometric mean concentration of 200 counts per 100 mL and instantaneous concentration of 400 counts per 100 mL are listed in Table 3-3.

The collection systems associated with municipal wastewater treatment facilities are also potential sources of fecal coliform bacteria. Sewage collection systems typically are placed adjacent to waterways. At these locations, there is a potential for collection system leaks which could result in elevated instream concentrations of fecal coliform bacteria. Sanitary sewer overflows (SSOs) are also a potential source, particularly after periods of intense rainfall. This source is associated with infrequent events, limited in duration and likely to have an insignificant long-term impact instream. Identified collection system and/or SSO problems are addressed by SCDHEC through compliance and enforcement mechanisms. Fairforest Creek in Spartanburg has reported very high fecal coliform concentrations (Appendix A Table A-3), which suggests leaking sanitary sewers or sewer overflows.

Table 3-1 Permitted Facilities Discharging Fecal Coliform Bacteria into Waterbodies of the Tyger River Basin

| Facility Name | NPDES No. | Flow Limits * (MGD) | Receiving Stream |
|---|---|---|---|
| PM UTILITIES INC/LOOKUP LODGE | SC0026379 | 0.030 | Burbank Creek |
| LAUREL VALLEY/N GVILLE COLLEGE | SC0026565 | 0.200 | Meadow Creek |
| WESTSIDE PROP/MIDWAY PARK WWTP | SC0030571 | 0.015 | Frey Creek |
| JACKSON MILLS/WELLFORD PLANT | SC0001716 | 0.050 | Unnamed Tributary |
| TOWN OF LYMAN | SC0021300 | 4.500 | Middle Tyger River |
| GREER/MAPLE CREEK PLANT | SC0046345 | 4.500 | South Tyger River |
| SPARTAN MILLS/STARTEX MILL | SC0002453 | 0.400 | Middle Tyger River |
| SSSD/FAIRFOREST PLANT | SC0020435 | 10.000 | Fairforest Creek |
| MILLIKEN/ARMITAGE PLANT | SC0023451 | 0.010 | Williams Creek |
| SSSD/MARILYNDALE SD | SC0030121 | 0.042 | Reedy Creek |
| SSSD/CAROLINA COUNTRY CLUB | SC0039560 | 0.100 | Fairforest Creek |
| SSSD/N TYGER RIVER WWTP | SC0043532 | 1.000 | North Tyger River |
| EASTMAN CHEMICAL COMPANY | SC0002321 | 0.036 | North Tyger River |
| TOWN OF JONESVILLE | SC0024988 | 0.250 | Mill Creek |
| SPARTANBURG BOYS HOME INC | SC0024449 | 0.004 | Mineral Springs |
| MIDLAND CAPITAL LLC | SC0036145 | 0.032 | South Tyger River |
| SC DEPT CORR/TYGER R CORRECTIONS | SC0036773 | 0.350 | Tyger River |
| UNION/BELTLINE PLANT | SC0021202 | 0.350 | Tinker Creek |
| UNITED UTILS/FAIRWOODS SD | SC0035041 | 0.065 | Fairforest Creek |
| UNION/TOSCH'S CREEK WWTP | SC0047244 | 6.000 | Fairforest Creek |
| SSSD/S. TYGER RV REGIONAL WWTP | SC0047732 | 1.000 | South Tyger River |

- Note: Flow limits are either permit limits or design limits.

Table 3-2 Impaired Water Quality Monitoring Stations Draining NPDES Facilities in the Tyger River Basin

| B-051 | B-008 | B-332 | B-005 | B-199 |
|---|---|---|---|---|
| SC0020435 | SC0002453 | SC0047732 | SC0026379 | SC0024988 |
| SC0002453 | SC0021300 | SC0036145 | SC0026565 | |
| SC0021300 | SC0001716 | SC0023451 | SC0046345 | **B-219** |
| SC0026379 | SC0002321 | SC0046345 | | SC0001716 |
| SC0026565 | SC0023451 | SC0026565 | **B-021** | |
| SC0039560 | SC0030571 | SC0026379 | SC0020435 | **B-287** |
| SC0030121 | SC0036145 | | SC0039560 | SC0021202 |
| SC0001716 | SC0043532 | **B-018A** | SC0030121 | |
| SC0046345 | SC0047732 | SC0001716 | | **B-336** |
| SC0002321 | SC0026379 | SC0002321 | **B-263** | SC0021202 |
| SC0021202 | SC0026565 | SC0030571 | SC0026565 | |
| SC0023451 | SC0046345 | SC0043532 | SC0026379 | |
| SC0024449 | | SC0002453 | | |
| SC0024988 | **BF-008** | SC0021300 | **B-014** | |
| SC0030571 | SC0047244 | | SC0002453 | |
| SC0036145 | SC0035041 | **BF-007** | SC0021300 | |
| SC0043532 | SC0020435 | SC0024449 | | |
| SC0047732 | SC0039560 | SC0039560 | **B-012** | |
| SC0035041 | SC0024988 | SC0030121 | SC0021300 | |
| SC0047244 | SC0024449 | SC0020435 | SC0002453 | |
| SC0036773 | SC0030121 | | | |

Table 3-3 Estimated Existing Fecal Coliform Bacteria Loads for Facilities in the Tyger River Basin

| NPDES Facility | Flow (MGD) | Existing Loading (counts/days) | Existing Loading (counts/30days) |
|---|---|---|---|
| SC0026379 | 0.030 | 4.54E+08 | 6.81E+09 |
| SC0026565 | 0.200 | 3.03E+09 | 4.54E+10 |
| SC0030571 | 0.015 | 2.27E+08 | 3.41E+09 |
| SC0001716 | 0.050 | 7.57E+08 | 1.14E+10 |
| SC0021300 | 4.500 | 6.81E+10 | 1.02E+12 |
| SC0046345 | 4.500 | 6.81E+10 | 1.02E+12 |
| SC0002453 | 0.400 | 6.06E+09 | 9.08E+10 |
| SC0020435 | 10.000 | 1.51E+11 | 2.27E+12 |
| SC0023451 | 0.010 | 1.51E+08 | 2.27E+09 |
| SC0030121 | 0.042 | 6.28E+08 | 9.43E+09 |
| SC0039560 | 0.100 | 1.51E+09 | 2.27E+10 |
| SC0043532 | 1.000 | 1.51E+10 | 2.27E+11 |
| SC0002321 | 0.036 | 5.45E+08 | 8.18E+09 |
| SC0024988 | 0.250 | 3.79E+09 | 5.68E+10 |
| SC0024449 | 0.004 | 5.30E+07 | 7.95E+08 |
| SC0036145 | 0.032 | 4.85E+08 | 7.27E+09 |
| SC0036773 | 0.350 | 5.30E+09 | 7.95E+10 |
| SC0021202 | 0.350 | 5.30E+09 | 7.95E+10 |
| SC0035041 | 0.065 | 9.84E+08 | 1.48E+10 |
| SC0047244 | 6.000 | 9.08E+10 | 1.36E+12 |
| SC0047732 | 1.000 | 1.51E+10 | 2.27E+11 |

### 3.1.2 Municipal Separate Storm System (NPDES)

Several towns and the surrounding areas of unincorporated Spartanburg and Greenville Counties in the watershed have or will have NPDES MS4 (Municipal Separate Storm Sewer System) permits (Figure 1-1). These permitted sewer systems will be treated as point sources in the TMDL calculations below. However for modeling purposes all urban areas will be evaluated together as urban nonpoint sources.

In 1990, EPA developed rules establishing Phase I of the National Pollutant Discharge Elimination System (NPDES) storm water program, designed to prevent harmful pollutants from being washed by storm water runoff into Municipal Separate Storm Sewer Systems (MS4s) (or from being dumped directly into the MS4) and then discharged into local waterbodies (SCDHEC, 2002). Phase I of the program required operators of medium and large MS4s (those generally serving populations of 100,000 or

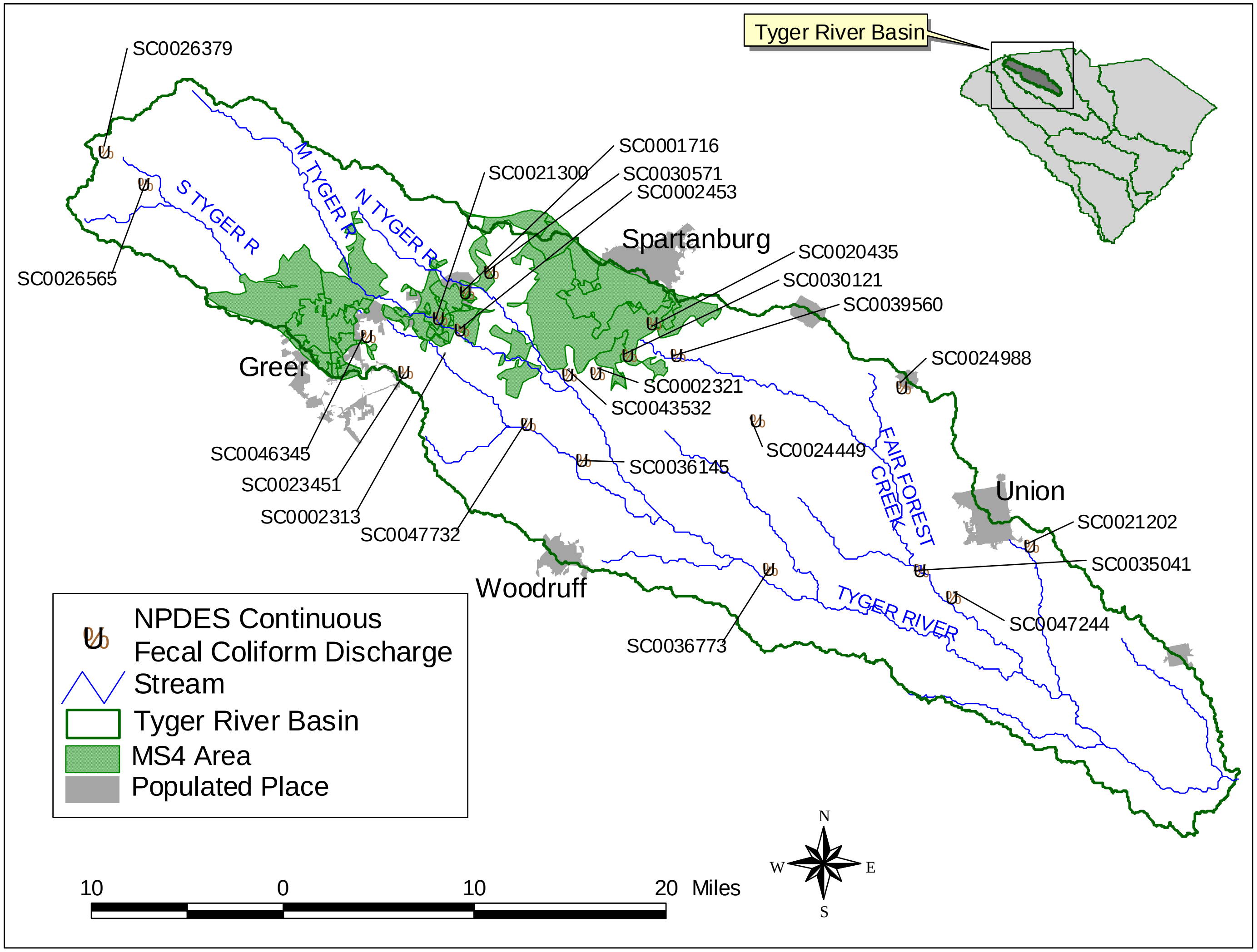


Figure 3-1 Active Fecal Coliform Bacteria Discharging NPDES Facilities

greater) to implement a storm water management program as a means to control polluted discharges from MS4s. Approved storm water management programs for medium and large MS4s are required to address a variety of water quality related issues including roadway runoff management, municipal owned operations, and hazardous waste treatment.

Phase II of the rule extends coverage of the NPDES storm water program to certain small MS4s. Small MS4s are defined as any MS4 that is not a medium or large MS4 covered by Phase I of the NPDES Storm Water Program. Phase II requires operators of regulated small MS4s to obtain NPDES permits and develop a storm water management program. Programs are to be designed to reduce discharges of pollutants to the "maximum extent practicable", protect water quality, and satisfy appropriate water quality requirements of the Clean Water Act.

## *3.2 Nonpoint Sources*

The land use distribution of the Tyger River basin provides insight into determining nonpoint sources of fecal coliform bacteria (Figure 1-2). In the watershed, 70 percent of the land area is classified forested, 10 percent is pastureland, and 6 percent of the area is urban. Key nonpoint sources identified in the watershed include livestock, manure application, failing septic systems, illicit discharges (including leaking and overflowing sewers), over land contributions from impervious surfaces, and natural sources.

### 3.2.1 Wildlife

Fecal coliform bacteria are found in forested areas, pastureland, and cropland due to the presence of wild animal sources such as deer, raccoons, wild turkeys and waterfowl. The Department of Natural Resources in South Carolina estimates the deer habitat in the basin at a density from 15 to 45 deer per square mile (SC Deer Density 2000 map). Deer habitat was assumed to include forests, cropland, and pastures. Wildlife waste is transported over land surfaces during rainfall events or may be directly deposited by animals into streams. The high percentage of permeable surfaces in forested areas increases the infiltration rate over the watershed area. This process ultimately reduces the runoff reaching streams by overland flow and reduces the significance of fecal coliform contributions transported over land.

### 3.2.2 Agricultural Activities and Grazing Animals

Agricultural land can be a source of fecal coliform bacteria. Runoff from grazing pastures, improper land application of animal wastes, livestock operations, and livestock with access to waterbodies are all agricultural sources of fecal coliform bacteria. Agricultural best management practices (BMPs) such as buffer strips, alternative watering sources, limiting livestock access to streams, and the proper land application of animal wastes reduce fecal coliform bacteria loading to waterbodies.

The number of animals in the watershed (Table 3-4), was estimated by area-weighting the 1997 USDA census data over the watershed area aggregated to pastureland for Greenville, Newberry, Spartanburg, and Union counties. Census data show that grazing cattle are of more relevance in the Tyger River basin than confined animal operations. Livestock, except for dairy cattle, are not usually confined and are typically grazing in the pastures where deposited manure is a source of nonpoint pollution. The time that cattle spend in streams is assumed to be 0.15 percent of their total gazing time. Hogs are anticipated to be generally confined, where as sheep are expected to spend all of their time grazing. Horses and ponies are expected to spend the majority of spring, summer, and fall months grazing in pastureland where manure is a source of nonpoint pollution.

Table 3-4 1997 USDA Agricultural Census Data Animal Estimates

| Animal | 1997 Census Estimate |
|---|---|
| Beef Cow | 8777 |
| Dairy Cow | 856 |
| Hog | 307 |
| Sheep | 28 |
| Horses and Ponies | 1051 |

### 3.2.3 Failing Septic Systems and Illicit Discharges

Failing septic systems and illegal discharges represent a nonpoint source that can contribute fecal coliform to receiving waterbodies through surface, subsurface malfunctions or direct discharges. Based on 1990 census information, population change from 1990 and 2000, and assuming an average of 2.5 people per household (U.S. Census, 2000), greater than 140,000 people in the Tyger River basin use septic systems. Though the precise failure rate is unknown, Schueler (1999) suggests an average septic failure rate of 20 percent. Many of these areas are also on sewer systems that may leak and/or overflow during rain events contributing significant loads of fecal coliform bacteria directly to streams.

### 3.2.4 Urban Runoff

Runoff from urban areas not permitted under the MS4 program are a significant source of fecal coliform bacteria in the Tyger River basin. Water quality data collected from streams draining many of the unpermitted communities show existing loads of fecal coliform bacteria at levels greater than 50 percent of the State’s instantaneous standards. Best management practices (BMPs) such as buffer strips and the proper disposal of domestic animal wastes reduce fecal coliform bacteria loading to waterbodies.

# 4.0 TECHNICAL APPROACH – LOAD-DURATION METHOD

Load-duration curves were developed for water quality stations in the Tyger River basin to establish allowable fecal coliform bacteria loads under various hydrologic conditions. The load-duration methodology uses the cumulative frequency distribution of streamflow and pollutant concentration (fecal coliform bacteria) data to estimate the allowable loads for a waterbody. Allowable load-duration curves were established in the basin using the instantaneous concentration of fecal coliform bacteria, minus a five percent margin of safety (MOS), and streamflow measured at various USGS stations in the Tyger River basin and surrounding watersheds, as shown in Figure 1-1 and listed in Table 4-1.

Table 4-1 USGS Stations Used to Establish Area-Weighted Flows

| Site Number | Site Name | From | To | Drainage Area (mile2) |
|---|---|---|---|---|
| 02153780 | CLARKS FORK CREEK NR SMYRNA, SC | 10/01/80 | 09/30/01 | 24.1 |
| 02156050 | LAWSONS FORK CREEK AT DEWEY PLANT NR INMAN, SC | 10/01/79 | 09/30/01 | 6.46 |
| 02157000 | N TYGER RIVER NEAR FAIRMONT, SC | 10/01/50 | 09/30/88 | 44.4 |
| 02160105 | TYGER RIVER NEAR DELTA, SC | 10/1/1973 | 9/30/2001 | 755 |
| 02164000 | REEDY RIVER NEAR GREENVILLE, SC | 11/21/41 | 09/30/01 | 48.6 |

Streamflow data was not available at each impaired water quality monitoring station to develop load-duration curves. Therefore, flows were determined by area-weighted data collected at USGS stations listed in Table 4-1. Data collected at these stations through 2001 were used to develop loading curves. For USGS station 02157000, the North Tyger River near Fairmont, where data were not collected through 2001, the program MOVE.1 was used to interpolate streamflow by comparing overlapping records with USGS station 02160105, Tyger River near Delta. Statistical analysis from matched stations and technical clarification of the MOVE.1 methods can be found in Appendix D.

Watershed characteristics (including the distribution of land use activities, ecoregions, and topography) for the USGS stations and impaired water quality monitoring sites were compared to associate stations to develop load-duration curves. Table 4-2 lists the impaired water quality monitoring stations and associated streamflow stations used to develop area-weighted flow relationships. The location of both USGS and water quality monitoring stations are identified in Figure 1-1.

The best available streamflow data were used when establishing area-weighted flows. To compare USGS stations with extensive datasets and similar watershed characteristics to impaired water quality stations, USGS stations outside the Tyger River basin were selected. Specifically, USGS 02153780 and 02156050 in the Upper Broad River basin and USGS 02164000 of the Saluda River basin were selected as appropriate streamflow stations. The gages were deemed appropriate based on their watershed area, land use distribution and extensive datasets. The Figure 4-1 illustrates the water yield for impaired stations associated with USGS station 02160105, located on Tyger River near Delta, South Carolina.

After calculating streamflow for each impaired monitoring station the data were ranked to determine the percent of time streamflow was exceeded. The streamflow was then multiplied by a concentration of 380 counts/100 mL (based on the instantaneous concentration and a five percent MOS) to generate a load-duration curve for each impaired station, shown in Figures B-26 through B-30 of Appendix B. The result of the load-duration curve is the TMDL target.

To define the TMDL for each station, an average of the load-duration curve was calculated. The average was calculated using loads at five percent intervals from the 10$^{th}$ percentile of flow exceeded to the 90$^{th}$ percentile of flow exceeded. Loads occurring at less than the 10$^{th}$ percentile of flow exceeded are extreme high flow events and the data collected at greater than the 90$^{th}$ percentile of flow exceeded are extreme low flow events and therefore were not considered in developing theses TMDLs. Loads established at intervals and the mean load for each station can be found in Appendix B, Table B-1.

Table 4-2 USGS Stations and Associated Water Quality Stations

| USGS Gage | Waterbody ID | Waterbody Name |
|---|---|---|
| 02153780 | B-336 | Tinker Ck |
| | BF-008 | Fairforest Ck |
| | BF-007 | Fairforest Ck |
| | B-317 | Mush Ck |
| 02156050 | B-199 | Mitchell Ck |
| 02157000 | B-315 | Tributary to N Tyger |
| | B-219 | N Tyger Rvr |
| | B-018A | N Tyger Rvr |
| | B-332 | S Tyger Rvr |
| | B-008 | Tyger Rvr |
| | B-014 | Middle Tyger Rvr |
| | B-012 | Middle Tyger Rvr |
| 02160105 | B-005 | S Tyger Rvr |
| | B-263 | S Tyger Rvr |
| | B-051 | Tyger Rvr |
| 02164000 | B-321 | Tributary to Fairforest |
| | B-020 | Fairforest Ck |
| | B-164 | Fairforest Ck |
| | B-019 | Jimmies Ck |
| | B-021 | Fairforest Ck |
| | B-067B | Toschs Ck |
| | B-067A | Toschs Ck |
| | B-235 | Kelsey Ck |
| | B-286 | Tinker Ck |
| | B-287 | Tinker Ck |

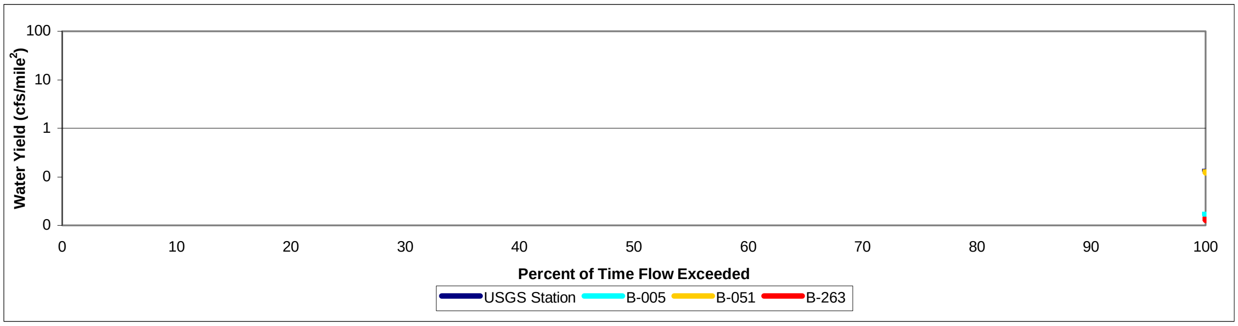


Figure 4-1 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02160105

# 5.0 DEVELOPMENT OF TOTAL MAXIMUM DAILY LOAD

A total maximum daily load (TMDL) for a given pollutant and waterbody is comprised of the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for both nonpoint sources and natural background levels. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this definition is represented by the equation:

$$\text{TMDL} = \sum \text{WLAs} + \sum \text{LAs} + \text{MOS}$$

The TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis to establish water quality-based controls. For some pollutants, TMDLs are expressed on a mass-loading basis (e.g., pounds per day). For bacteria, however, TMDLs can be expressed in terms of organism counts (or resulting concentration), in accordance with 40 CFR 130.2(l).

## *5.1 Critical Conditions*

Critical conditions for fecal coliform bacteria in the Tyger River basin occur at various flow regimes. The load-duration curve methodology used to establish TMDLs in the watershed considers various hydrologic conditions critical in maintaining water quality standards.

## *5.2 Existing Load*

The existing load for each impaired station was established using observed fecal coliform bacteria data and area-weighted streamflow. The measured data occurring at less than the

$10^{th}$ percentile of flow exceeded is an extreme high flow event and the data collected at greater than the $90^{th}$ percentile of flow exceeded is an extreme low flow event and therefore not considered as critical conditions for these TMDLs.

The data violating the instantaneous concentration were isolated and a best-fit trendline was fit to violating data. The power trendline was determined using a best-fit relationship that was most representative of the violating data. The equation representing the trendline was then used to calculate the average violating load that occurred between the $10^{th}$ and $90^{th}$ percentiles, at every fifth percentile. This average load is equal to the existing instream fecal coliform bacteria load at the associated station. The existing nonpoint source load is equal to the existing instream load minus the wasteload from point sources.

Figure 5-1 presents the power best-fit trendline for station B-051, the impaired station on the Tyger River at SC 72 southwest of Carlisle. Interval loads calculated for existing instream conditions are presented in Table B-2. Power trendlines are presented in Figures B-1 through B-25 of Appendix B. Existing nonpoint loads calculated for each station are listed in Table 5-1.

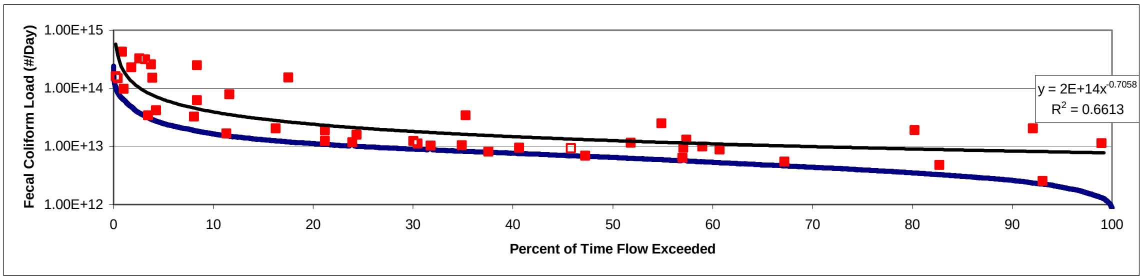


Figure 5-1 Power Trendline Generated from Violating Fecal Coliform Bacteria at B-051

Table 5-1 Existing Loads for Impaired Water Quality Stations in the Tyger River Basin (03050107)

| Station ID | Existing Load (counts/day) |
|---|---|
| B-005 | 5.47E+12 |
| B-008 | 7.86E+12 |
| B-012 | 1.23E+12 |
| B-014 | 2.24E+12 |
| B-018A | 6.98E+12 |
| B-019 | 2.32E+11 |
| B-020 | 5.09E+12 |
| B-021 | 1.93E+12 |
| B-051 | 1.53E+13 |
| B-067A | 3.00E+11 |
| B-067B | 2.14E+11 |
| B-164 | 1.41E+12 |
| B-199 | 7.35E+10 |

| Station ID | Existing Load (counts/day) |
|---|---|
| B-219 | 6.49E+11 |
| B-235 | 1.32E+11 |
| B-263 | 8.78E+11 |
| B-286 | 8.66E+10 |
| B-287 | 5.64E+10 |
| B-315 | 3.96E+11 |
| B-317 | 1.21E+11 |
| B-321 | 2.21E+10 |
| B-332 | 2.14E+12 |
| B-336 | 1.78E+11 |
| BF-007 | 5.91E+11 |
| BF-008 | 1.16E+12 |

### 5.3 Existing Wasteload

The existing wasteload was calculated for each NPDES permitted continuous discharge. The facilities were assumed to discharge at permitted flows (design flows when a flow limit was not designated in the permit) and permitted limits of fecal coliform bacteria equal to the State criteria for both instantaneous and geometric mean loads. In South Carolina, NPDES permittees that discharge sanitary wastewater must meet the State's criteria for fecal coliform bacteria at the point of discharge (i.e. a daily maximum concentration of 400 counts per 100 mL, and a 30-day geometric mean of 200 counts per 100 mL). Under these permitted concentrations facilities should not be in exceedance of the fecal coliform bacteria water quality criteria, and therefore, not considered to be a major contributing source. If facilities are discharging at greater than permitted concentrations this is an illicit discharge and regulated through the NPDES program. Allowable TMDL wasteloads for impaired stations, as shown in Table 5-2, are equal to loads calculated for facilities in the basin.

### 5.4 Margin of Safety

There are two methods for incorporating a margin of safety (MOS) in the analysis: a) by implicitly incorporating the MOS using conservative assumptions to develop allocations; or b) by explicitly specifying a portion of the TMDL as the MOS and using the remainder for allocations. For the Tyger River basin TMDLs, both methods were applied to incorporate a MOS. An implicit MOS was incorporated through the use of conservative assumptions in developing the TMDL, such as the use of the design or permitted flow for NPDES facilities and the use of a trendline to establish a total instream load. A five percent explicit MOS was reserved from the water quality criteria in developing the load-duration curves. Specifically, the water quality target was set at 190 counts per 100 mL for the geometric mean 30-day period and 380 counts per 100 mL for the instantaneous criterion, which is five percent lower than the water quality criteria of 200 and 400 counts per 100 mL, respectively.

### 5.5 Total Maximum Daily Load

The TMDL represents the maximum fecal coliform bacteria load the stream may carry and still meet water quality standards. The TMDL is presented in fecal coliform counts to be protective of both the instantaneous, per day, and geometric mean, per 30-day, criteria. Table 5-3 defines the fecal coliform bacteria total maximum daily load for protection of water quality standards for impaired stations in the Tyger River Basin.

There are seven municipalities in the watershed that have or will have NPDES MS4 permits. Greenville County became covered under NPDES Phase I in August of 2000. The towns and Spartanburg County will eventually be covered under one or more NPDES phase II stormwater permits. The reduction percentages in this TMDL apply also to the fecal coliform waste load attributable to those areas of the watershed which are covered or will be covered under NPDES MS4 (Municipal Separate Storm Sewer

System) permits. Compliance by these municipalities with the terms of their individual MS4 permits will fulfill any obligations they have towards implementing this TMDL.
The MS4 WLAs and LAs for Fairforest Creek at B-020 and B-164, which are expressed as percent reductions, were reduced from 96 % and 83 % respectively, to 73 % because of the evidence of leaking sewers or sewer overflows into the creek. The station upstream of these locations, B-321 and the station downstream, B-021, which have not shown the extremely high fecal coliform concentrations, require reductions in load of 73 %. Therefore it is reasonable to assign the two intermediate locations of Fairforest Creek the same reductions for the MS4 contributions and nonpoint sources.

Table 5-2 Wasteloads from NPDES Continuous Discharges to Impaired Water Quality Stations in the Tyger River Basin (03050107)

| Station ID | Existing Waste Load Continuous (counts/day) |
|---|---|
| **B-005** | 7.16E+10 |
| **B-008** | 1.78E+11 |
| **B-012** | 7.42E+10 |
| **B-014** | 7.42E+10 |
| **B-018A** | 9.09E+10 |
| **B-019** | NA |
| **B-020** | NA |
| **B-021** | 1.54E+11 |
| **B-051** | 4.38E+11 |
| **B-067A** | NA |
| **B-067B** | NA |
| **B-164** | NA |
| **B-199** | 3.79E+09 |
| **B-219** | 7.57E+08 |
| **B-235** | NA |
| **B-263** | 3.48E+09 |
| **B-286** | NA |
| **B-287** | 5.30E+09 |
| **B-315** | NA |
| **B-317** | NA |
| **B-321** | NA |
| **B-332** | 8.74E+10 |
| **B-336** | 5.30E+09 |
| **BF-007** | 1.54E+11 |
| **BF-008** | 2.49E+11 |

Table 5-3 Total Maximum Daily Loads for Impaired Water Quality Stations in the Tyger River Basin (03050107)

| Station ID | Existing Waste Load | TMDL WLA | | Existing Load | TMDL LA | MOS | TMDL[3] | Percent Reduction[4] |
|---|---|---|---|---|---|---|---|---|
| | Continuous (counts/day) | Continuous[1] (counts/day) | MS4[2] | (counts/day) | (counts/day) | (counts/day) | (counts/day) | |
| **B-005** | 7.16E+10 | 7.16E+10 | 83% | 5.47E+12 | 8.05E+11 | 4.87E+10 | 9.25E+11 | 83% |
| **B-008** | 1.78E+11 | 1.78E+11 | NA | 7.86E+12 | 3.17E+12 | 1.86E+11 | 3.53E+12 | 55% |
| **B-012** | 7.42E+10 | 7.42E+10 | 40% | 1.23E+12 | 6.21E+11 | 3.86E+10 | 7.33E+11 | 40% |
| **B-014** | 7.42E+10 | 7.42E+10 | 63% | 2.24E+12 | 7.11E+11 | 4.36E+10 | 8.29E+11 | 63% |
| **B-018A** | 9.09E+10 | 9.09E+10 | NA | 6.98E+12 | 1.55E+12 | 9.10E+10 | 1.73E+12 | 75% |
| **B-019** | NA | NA | NA | 2.32E+11 | 3.96E+10 | 2.20E+09 | 4.18E+10 | 82% |
| **B-020** | NA | NA | 73% | 5.09E+12 | 1.82E+11 | 1.01E+10 | 1.92E+11 | 73% |
| **B-021** | 1.54E+11 | 1.54E+11 | 73% | 1.93E+12 | 3.36E+11 | 2.72E+10 | 5.17E+11 | 73% |
| **B-051** | 4.38E+11 | 4.38E+11 | NA | 1.53E+13 | 6.40E+12 | 3.80E+11 | 7.22E+12 | 53% |
| **B-067A** | NA | NA | NA | 3.00E+11 | 6.16E+10 | 3.42E+09 | 6.50E+10 | 78% |
| **B-067B** | NA | NA | NA | 2.14E+11 | 5.34E+10 | 2.97E+09 | 5.64E+10 | 74% |
| **B-164** | NA | NA | 73% | 1.41E+12 | 2.30E+11 | 1.28E+10 | 2.42E+11 | 73% |
| **B-199** | 3.79E+09 | 3.79E+09 | NA | 7.35E+10 | 3.39E+10 | 2.09E+09 | 3.97E+10 | 46% |
| **B-219** | 7.57E+08 | 7.57E+08 | 46% | 6.49E+11 | 3.29E+11 | 1.83E+10 | 3.48E+11 | 46% |
| **B-235** | NA | NA | 64% | 1.32E+11 | 4.56E+10 | 2.53E+09 | 4.81E+10 | 64% |
| **B-263** | 3.48E+09 | 3.48E+09 | 13% | 8.78E+11 | 7.21E+11 | 4.03E+10 | 7.65E+11 | 13% |
| **B-286** | NA | NA | NA | 8.66E+10 | 3.33E+10 | 1.85E+09 | 3.52E+10 | 59% |
| **B-287** | 5.30E+09 | 5.30E+09 | NA | 5.64E+10 | 3.94E+10 | 2.48E+09 | 4.72E+10 | 16% |
| **B-315** | NA | NA | 52% | 3.96E+11 | 1.79E+11 | 9.94E+09 | 1.89E+11 | 52% |
| **B-317** | NA | NA | NA | 1.21E+11 | 7.90E+10 | 4.39E+09 | 8.33E+10 | 31% |
| **B-321** | NA | NA | 73% | 2.21E+10 | 5.66E+09 | 3.15E+08 | 5.98E+09 | 73% |
| **B-332** | 8.74E+10 | 8.74E+10 | NA | 2.14E+12 | 1.28E+12 | 7.58E+10 | 1.44E+12 | 33% |
| **B-336** | 5.30E+09 | 5.30E+09 | NA | 1.78E+11 | 1.16E+11 | 6.75E+09 | 1.28E+11 | 28% |
| **BF-007** | 1.54E+11 | 1.54E+11 | NA | 5.91E+11 | 1.11E+11 | 1.47E+10 | 2.79E+11 | 53% |
| **BF-008** | 2.49E+11 | 2.49E+11 | NA | 1.16E+12 | 2.12E+11 | 2.56E+10 | 4.87E+11 | 58% |

Table Notes:

1. Total monthly wasteload (#/30 days) cannot exceed loads listed in Table 3-3.
2. MS4 expressed as percent reduction equal to LA reduction.
3. TMDLs expressed as monthly load (#/30 days) by station are listed in Table B-1.
4. Percent reduction applies to LA and MS4 components when an MS4 is in the watershed.

# 6.0 IMPLEMENTATION

As discussed in the *Implementation Plan for Achieving Total Maximum Daily Load Reductions From Nonpoint Sources for the State of South Carolina* (SCDHEC,1998), South Carolina has several tools available for implementing this nonpoint source TMDL. Specifically, SCDHEC's animal agriculture permitting program addresses animal operations and land application of animal wastes. In addition, SCDHEC will work with the existing agencies in the area to provide nonpoint source education in the Tyger River watershed. Local sources of nonpoint source education and assistance include Clemson Extension Service, the Natural Resource Conservation Service (NRCS), the Greenville, Spartanburg, Newberry, and Union Counties Soil and Water Conservation Services, and the South Carolina Department of Natural Resources. Clemson Extension Service offers a 'Farm-A-Syst' package to farmers. Farm-A-Syst allows the farmer to evaluate practices on their property and determine the nonpoint source impact they may be having. It recommends best management practices (BMPs) to correct nonpoint source problems on the farm. NRCS can provide cost share money to land owners installing BMPs.

SCDHEC is empowered under the State Pollution Control Act to perform investigations of and pursue enforcement for activities and conditions which threaten the quality of waters of the state.

The iterative BMP approach as defined in the general storm water NPDES MS4 permit is expected to provide significant implementation of this TMDL. Discovery and removal of illicit storm drain cross connection is one important element of the storm water NPDES permit. Public nonpoint source pollution education is another.

Also, other interested parties (universities, local watershed groups, etc.) may apply for section 319 grants to install BMPs that will reduce fecal coliform loading to the Tyger River and its tributaries. TMDL implementation projects are given highest priority for 319 funding.

In addition to the resources cited above for the implementation of this TMDL in the Tyger River watershed, Clemson Extension has developed a Home-A-Syst handbook that can help urban or rural homeowners reduce sources of NPS pollution on their property. This document guides homeowners through a self-assessment, including information on proper maintenance practices for septic tanks. SCDHEC also employs a nonpoint source educator who can assist with distribution of these tools as well as provide additional BMP information.

Using existing authorities and mechanisms, these measures will be implemented in the Tyger River watershed in order to bring about the necessary reductions in fecal coliform bacteria loading to the Tyger River and its impaired tributaries. DHEC will continue to monitor, according to the basin monitoring schedule, the effectiveness of implementation measures and evaluate stream water quality as the implementation strategy progresses.

## 7.0 REFERENCES

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# APPENDIX A Data

Table A-1 Percent of Watershed Area Aggregated by Land Use Class for Areas Draining to Streamflow and Water Quality Monitoring Stations in the Tyger River Basin

| Monitoring Station ID | Water | Urban | Row Crop | Pasture | Forest | Barren |
|---|---|---|---|---|---|---|
| USGS 02157000 | 1.5% | 5.9% | 21.3% | 13.4% | 56.8% | 1.1% |
| USGS 02153780 | 0.4% | 0.8% | 4.1% | 5.6% | 89.2% | 0.0% |
| USGS 02156050 | 0.4% | 19.6% | 26.3% | 14.6% | 39.0% | 0.1% |
| USGS 02164000 | 0.3% | 52.5% | 3.1% | 6.3% | 37.4% | 0.4% |
| B-005 | 1.9% | 9.6% | 11.3% | 13.2% | 63.9% | 0.1% |
| B-008 | 1.1% | 6.9% | 15.4% | 14.7% | 61.5% | 0.3% |
| B-012 | 1.1% | 4.1% | 16.7% | 15.4% | 62.4% | 0.3% |
| B-014 | 1.0% | 5.7% | 16.4% | 14.6% | 62.0% | 0.3% |
| B-018A | 0.9% | 7.7% | 16.3% | 13.8% | 60.8% | 0.5% |
| B-019 | 0.1% | 28.9% | 16.1% | 12.4% | 42.5% | 0.0% |
| B-020 | 0.1% | 60.5% | 4.6% | 4.3% | 30.4% | 0.1% |
| B-021 | 0.4% | 35.9% | 8.6% | 7.5% | 47.2% | 0.4% |
| B-051/USGS 02160105 | 0.7% | 6.7% | 11.4% | 10.2% | 69.5% | 1.6% |
| B-067A | 0.2% | 34.5% | 11.0% | 2.0% | 51.4% | 0.8% |
| B-067B | 0.3% | 39.4% | 9.0% | 2.1% | 48.4% | 0.9% |
| B-164 | 0.1% | 58.4% | 4.4% | 4.5% | 32.3% | 0.2% |
| B-199 | 1.4% | 9.7% | 17.5% | 10.8% | 60.1% | 0.3% |
| B-219 | 1.9% | 5.1% | 22.8% | 15.0% | 54.0% | 1.2% |
| B-235 | 0.1% | 35.1% | 5.4% | 7.4% | 51.9% | 0.1% |
| B-263 | 2.2% | 6.8% | 10.1% | 11.3% | 69.4% | 0.2% |
| B-286 | 0.0% | 34.6% | 5.0% | 1.8% | 58.4% | 0.1% |
| B-287 | 0.0% | 26.7% | 6.6% | 1.7% | 64.8% | 0.2% |
| B-315 | 0.4% | 4.8% | 27.6% | 16.1% | 49.9% | 1.2% |
| B-317 | 0.4% | 1.3% | 5.2% | 7.4% | 85.7% | 0.0% |
| B-321 | 0.5% | 57.1% | 7.2% | 9.1% | 25.6% | 0.6% |
| B-332 | 1.5% | 7.2% | 14.4% | 15.5% | 61.3% | 0.1% |
| B-336 | 0.2% | 0.6% | 14.2% | 6.6% | 76.1% | 2.2% |
| BF-007 | 0.5% | 2.0% | 5.5% | 6.3% | 84.0% | 1.7% |
| BF-008 | 0.2% | 1.9% | 10.0% | 6.9% | 78.0% | 3.0% |

Table A-2 Watershed Area in Square Miles Aggregated by Land Use Class for Areas Draining to Streamflow and Water Quality Monitoring Stations in the Tyger River Basin

| Monitoring Station ID | Water | Urban | Row Crop | Pasture | Forest | Barren | Total |
|---|---|---|---|---|---|---|---|
| | (miles$^2$) | | | | | | |
| USGS 02157000 | 0.7 | 2.6 | 9.4 | 5.9 | 25 | 0.5 | 44 |
| USGS 02153780 | 0.1 | 0.2 | 1.0 | 1.4 | 22 | 0.0 | 24 |
| USGS 02156050 | 0.0 | 1.3 | 1.7 | 1.0 | 2.6 | 0.0 | 6.6 |
| USGS 02164000 | 0.1 | 25 | 1.5 | 3.1 | 18 | 0.2 | 48 |
| B-005 | 1.8 | 9.3 | 11 | 13 | 62 | 0.1 | 97 |
| B-008 | 3.8 | 24 | 53 | 51 | 213 | 1.2 | 347 |
| B-012 | 0.8 | 2.9 | 12 | 11 | 45 | 0.2 | 72 |
| B-014 | 0.8 | 4.6 | 13 | 12 | 50 | 0.2 | 81 |
| B-018A | 1.6 | 13 | 28 | 23 | 103 | 0.8 | 170 |
| B-019 | 0.0 | 1.1 | 0.6 | 0.5 | 1.6 | 0.0 | 3.7 |
| B-020 | 0.0 | 10 | 0.8 | 0.7 | 5.1 | 0.0 | 17 |
| B-021 | 0.2 | 16 | 3.9 | 3.4 | 21 | 0.2 | 45 |
| B-051/USGS 02160105 | 5.6 | 50 | 86 | 77 | 525 | 12 | 755 |
| B-067A | 0.0 | 2.0 | 0.6 | 0.1 | 2.9 | 0.0 | 5.7 |
| B-067B | 0.0 | 1.9 | 0.4 | 0.1 | 2.4 | 0.0 | 4.9 |
| B-164 | 0.0 | 12 | 0.9 | 0.9 | 6.9 | 0.0 | 21 |
| B-199 | 0.1 | 0.4 | 0.7 | 0.4 | 2.3 | 0.0 | 3.8 |
| B-219 | 0.6 | 1.7 | 7.8 | 5.1 | 18 | 0.4 | 34 |
| B-235 | 0.0 | 1.5 | 0.2 | 0.3 | 2.2 | 0.0 | 4.2 |
| B-263 | 1.8 | 5.4 | 8.1 | 9.1 | 56 | 0.1 | 80 |
| B-286 | 0.0 | 1.1 | 0.2 | 0.1 | 1.8 | 0.0 | 3.1 |
| B-287 | 0.0 | 1.1 | 0.3 | 0.1 | 2.7 | 0.0 | 4.1 |
| B-315 | 0.1 | 0.9 | 5.1 | 3.0 | 9.2 | 0.2 | 19 |
| B-317 | 0.1 | 0.2 | 0.8 | 1.2 | 13 | 0.0 | 16 |
| B-321 | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.5 |
| B-332 | 2.1 | 10 | 20 | 22 | 87 | 0.2 | 141 |
| B-336 | 0.1 | 0.2 | 3.4 | 1.6 | 18 | 0.5 | 24 |
| BF-007 | 0.3 | 1.1 | 2.9 | 3.3 | 44 | 0.9 | 53 |
| BF-008 | 0.2 | 1.8 | 9.2 | 6.3 | 72 | 2.7 | 92 |

Table A-3 Fecal Coliform Data Collected between 1990 and 2001 at Water Quality Monitoring Stations in the Tyger River Watershed

| B-005 | Value |
|---|---|
| 5/29/90 | 7300 |
| 6/14/90 | 240 |
| 7/12/90 | 270 |
| 8/24/90 | 5000 |
| 9/26/90 | 440 |
| 10/11/90 | 810 |
| 5/21/91 | 2000 |
| 6/14/91 | 160 |
| 7/23/91 | 150 |
| 8/15/91 | 1100 |
| 9/13/91 | 130 |
| 10/10/91 | 130 |
| 5/18/93 | 200 |
| 6/8/93 | 190 |
| 7/21/93 | 300 |
| 8/5/93 | 120 |
| 9/7/93 | 81 |
| 10/4/93 | 180 |
| 5/5/94 | 280 |
| 6/23/94 | 250 |
| 7/12/94 | 1100 |
| 8/16/94 | 1300 |
| 9/22/94 | 320 |
| 10/13/94 | 2900 |
| 5/4/95 | 150 |
| 6/9/95 | 240 |
| 7/13/95 | 260 |
| 8/24/95 | 860 |
| 9/29/95 | 220 |
| 10/16/95 | 390 |
| 5/25/96 | 110 |
| 6/11/96 | 800 |
| 7/12/96 | 1600 |
| 8/9/96 | 2700 |
| 9/13/96 | 580 |
| 10/11/96 | 140 |

| B-005 | Value |
|---|---|
| 5/15/97 | 270 |
| 6/20/97 | 400 |
| 7/18/97 | 450 |
| 8/15/97 | 480 |
| 9/5/97 | 150 |
| 10/3/97 | 100 |
| 5/15/98 | 220 |
| 6/11/98 | 1400 |
| 7/16/98 | 190 |
| 8/18/98 | 430 |
| 10/7/98 | 900 |
| 5/15/98 | 220 |
| 5/3/99 | 140 |
| 6/8/99 | 180 |
| 7/20/99 | 200 |
| 8/31/99 | 190 |
| 9/22/99 | 3200 |
| 10/25/99 | 40 |
| 5/16/00 | 30 |
| 6/20/00 | 250 |
| 7/26/00 | 180 |
| 8/22/00 | 140 |
| 9/12/00 | 240 |
| 10/3/00 | 230 |
| 1/17/01 | 60 |
| 2/7/01 | 240 |
| 3/8/01 | 63 |
| 6/25/01 | 460 |
| 7/13/01 | 160 |
| 8/21/01 | 94 |
| 9/11/01 | 120 |
| 9/21/01 | 220 |
| 10/12/01 | 260 |
| 11/6/01 | 160 |
| 12/13/01 | 290 |

Table A-3 (Continued)

| B-008 | Value |
|---|---|
| 1/3/90 | 200 |
| 2/8/90 | 780 |
| 3/1/90 | 200 |
| 4/5/90 | 2610 |
| 5/30/90 | 710 |
| 6/19/90 | 250 |
| 7/25/90 | 560 |
| 8/28/90 | 180 |
| 9/19/90 | 250 |
| 10/5/90 | 580 |
| 11/2/90 | 2440 |
| 12/4/90 | 1400 |
| 1/4/91 | 380 |
| 2/7/91 | 880 |
| 3/8/91 | 110 |
| 4/11/91 | 480 |
| 5/23/91 | 580 |
| 6/24/91 | 3400 |
| 7/25/91 | 180 |
| 8/14/91 | 790 |
| 9/23/91 | 640 |
| 10/1/91 | 330 |
| 11/8/91 | 520 |
| 12/2/91 | 410 |
| 1/8/92 | 290 |
| 2/7/92 | 80 |
| 3/4/92 | 360 |
| 4/8/92 | 270 |
| 5/12/92 | 120 |
| 6/5/92 | 2600 |
| 7/9/92 | 110 |
| 8/3/92 | 120 |
| 9/1/92 | 200 |
| 10/1/92 | 360 |
| 11/24/92 | 940 |
| 12/10/92 | 2200 |
| 1/8/93 | 8000 |
| 2/4/93 | 130 |
| 3/2/93 | 130 |
| 4/8/93 | 200 |
| 5/11/93 | 260 |
| 6/15/93 | 360 |
| 7/13/93 | 200 |
| 8/2/93 | 220 |

| B-008 | Value |
|---|---|
| 9/23/93 | 240 |
| 10/4/93 | 220 |
| 11/4/93 | 150 |
| 12/8/93 | 220 |
| 1/13/94 | 780 |
| 2/2/94 | 180 |
| 3/8/94 | 94 |
| 4/14/94 | 400 |
| 5/16/94 | 300 |
| 6/10/94 | 540 |
| 7/14/94 | 460 |
| 8/19/94 | 680 |
| 10/15/94 | 480 |
| 10/26/94 | 40 |
| 11/16/94 | 40 |
| 12/6/94 | 1700 |
| 1/5/95 | 510 |
| 2/2/95 | 140 |
| 3/8/95 | 460 |
| 4/24/95 | 260 |
| 5/8/95 | 150 |
| 6/8/95 | 390 |
| 7/17/95 | 1300 |
| 8/8/95 | 370 |
| 9/13/95 | 840 |
| 10/9/95 | 300 |
| 11/8/95 | 2300 |
| 12/7/95 | 540 |
| 1/18/96 | 220 |
| 2/7/96 | 120 |
| 3/14/96 | 160 |
| 4/12/96 | 120 |
| 5/28/96 | 1700 |
| 6/26/96 | 200 |
| 7/30/96 | 310 |
| 8/20/96 | 480 |
| 9/17/96 | 1200 |
| 10/23/96 | 140 |
| 11/22/96 | 1200 |
| 12/5/96 | 360 |
| 1/17/97 | 580 |
| 2/6/97 | 160 |
| 3/5/97 | 460 |
| 4/1/97 | 180 |

| B-008 | Value |
|---|---|
| 5/29/97 | 280 |
| 6/13/97 | 1200 |
| 7/29/97 | 790 |
| 8/13/97 | 300 |
| 9/24/97 | 1700 |
| 10/7/97 | 160 |
| 11/24/97 | 260 |
| 12/12/97 | 170 |
| 1/9/98 | 2000 |
| 3/6/98 | 220 |
| 4/21/98 | 680 |
| 6/25/98 | 190 |
| 7/21/98 | 1200 |
| 8/6/98 | 180 |
| 9/9/98 | 800 |
| 10/7/98 | 800 |
| 11/12/98 | 400 |
| 12/16/98 | 1200 |
| 1/7/99 | 250 |
| 2/11/99 | 220 |
| 3/18/99 | 100 |
| 4/22/99 | 77 |
| 5/4/99 | 86 |
| 6/7/99 | 150 |
| 7/19/99 | 280 |
| 8/24/99 | 1600 |
| 9/27/99 | 550 |
| 10/4/99 | 220 |
| 11/10/99 | 200 |
| 12/1/99 | 240 |
| 1/12/00 | 290 |
| 2/9/00 | 55 |
| 3/9/00 | 140 |
| 4/25/00 | *Present >QL |
| 5/16/00 | 93 |
| 6/20/00 | 230 |
| 7/26/00 | 160 |
| 8/22/00 | 180 |
| 9/12/00 | 300 |
| 10/3/00 | 380 |
| 11/16/00 | 260 |
| 12/12/00 | 160 |

Table A-3 (Continued)

| B-012 | Value |
|---|---|
| 5/29/90 | 1400 |
| 6/14/90 | 4400 |
| 7/12/90 | 13000 |
| 8/24/90 | 2200 |
| 9/26/90 | 6400 |
| 10/11/90 | 5700 |
| 5/21/91 | 960 |
| 6/14/91 | 300 |
| 7/23/91 | 180 |
| 8/15/91 | 410 |
| 9/13/91 | 700 |
| 10/10/91 | 260 |
| 5/18/93 | 370 |
| 6/8/93 | 310 |
| 7/21/93 | 140 |
| 8/5/93 | 110 |
| 9/7/93 | 200 |
| 10/4/93 | 200 |
| 5/5/94 | 920 |
| 6/23/94 | 230 |
| 7/12/94 | 6100 |
| 8/16/94 | 5200 |
| 9/22/94 | 290 |
| 10/13/94 | 620 |
| 5/4/95 | 250 |
| 6/9/95 | 70 |
| 7/13/95 | 800 |
| 9/29/95 | 460 |
| 10/16/95 | 300 |

| B-012 | Value |
|---|---|
| 5/25/96 | 190 |
| 6/11/96 | 920 |
| 7/12/96 | 240 |
| 8/9/96 | 110 |
| 9/13/96 | 600 |
| 10/11/96 | 220 |
| 5/15/97 | 300 |
| 6/20/97 | 1200 |
| 7/18/97 | 2700 |
| 8/15/97 | 120 |
| 9/5/97 | 270 |
| 10/3/97 | 200 |
| 5/15/98 | 240 |
| 6/11/98 | 240 |
| 7/16/98 | 210 |
| 8/18/98 | 350 |
| 10/7/98 | 460 |
| 5/3/99 | 160 |
| 6/8/99 | 230 |
| 7/20/99 | 450 |
| 8/31/99 | 1200 |
| 9/22/99 | 930 |
| 10/25/99 | 90 |
| 5/16/00 | 620 |
| 6/20/00 | 620 |
| 7/26/00 | 570 |
| 8/22/00 | 610 |
| 9/12/00 | 4600 |
| 10/3/00 | 600 |

Table A-3 (Continued)

| B-014 | Value |
|---|---|
| 11/16/1994 | 90 |
| 12/6/1994 | 3000 |
| 1/5/1995 | 1700 |
| 2/2/1995 | 1300 |
| 3/8/1995 | 570 |
| 4/24/1995 | 2000 |
| 5/4/1995 | 200 |
| 6/9/1995 | 160 |
| 7/13/1995 | 490 |
| 8/24/1995 | 500 |
| 9/29/1995 | 740 |
| 10/16/1995 | 350 |
| 11/12/1998 | 160 |
| 12/16/1998 | 1100 |
| 1/7/1999 | 100 |
| 2/11/1999 | 55 |
| 3/18/1999 | 55 |
| 4/22/1999 | 64 |
| 5/27/1999 | 45 |
| 6/30/1999 | 120 |
| 7/27/1999 | 40 |
| 8/26/1999 | 310 |
| 9/29/1999 | 570 |
| 10/26/1999 | 120 |
| 1/17/2001 | 90 |
| 2/7/2001 | 160 |
| 3/8/2001 | 40 |
| 7/13/2001 | 290 |
| 8/21/2001 | 410 |
| 9/11/2001 | 160 |
| 9/21/2001 | 570 |
| 10/12/2001 | 250 |
| 11/6/2001 | 73 |
| 12/13/2001 | 280 |

Table A-3 (Continued)

| B-018A | Value |
|---|---|
| 11/16/94 | 70 |
| 12/6/94 | 2600 |
| 1/5/95 | 240 |
| 2/2/95 | 400 |
| 3/8/95 | 930 |
| 4/24/95 | 1300 |
| 5/31/95 | 1500 |
| 6/9/95 | 350 |
| 7/13/95 | 520 |
| 8/24/95 | 620 |
| 9/29/95 | 420 |
| 10/16/95 | 900 |
| 5/28/96 | 3100 |
| 6/26/96 | 270 |
| 7/30/96 | 600 |
| 8/20/96 | 680 |
| 9/17/96 | 6000 |
| 10/23/96 | 140 |
| 5/29/97 | 420 |
| 6/13/97 | 17000 |
| 7/29/97 | 2800 |
| 8/13/97 | 350 |
| 9/24/97 | 1400 |
| 10/7/97 | 230 |
| 5/5/98 | 340 |
| 6/25/98 | 320 |
| 7/21/98 | 6000 |
| 8/6/98 | 640 |
| 9/9/98 | 1100 |

| B-018A | Value |
|---|---|
| 10/7/98 | 4000 |
| 11/12/98 | 460 |
| 12/16/98 | 6000 |
| 1/7/99 | 280 |
| 2/11/99 | 150 |
| 3/18/99 | 140 |
| 4/22/99 | 110 |
| 5/4/99 | 280 |
| 6/7/99 | 190 |
| 7/19/99 | 280 |
| 8/24/99 | 980 |
| 9/27/99 | 370 |
| 10/4/99 | 3900 |
| 5/16/00 | 220 |
| 6/20/00 | 220 |
| 7/26/00 | 300 |
| 8/22/00 | 200 |
| 9/12/00 | 320 |
| 10/3/00 | 820 |
| 2/7/01 | 210 |
| 3/8/01 | 490 |
| 7/12/01 | 260 |
| 8/16/01 | 550 |
| 9/11/01 | 210 |
| 9/21/01 | 460 |
| 10/10/01 | 620 |
| 11/5/01 | 120 |
| 12/13/01 | 800 |

Table A-3 (Continued)

| B-019 | Value |
|---|---|
| 5/30/90 | 320 |
| 6/19/90 | 310 |
| 7/25/90 | 580 |
| 8/28/90 | 170 |
| 9/19/90 | 160 |
| 10/5/90 | 180 |
| 5/23/91 | 200 |
| 6/24/91 | 330 |
| 7/25/91 | 1500 |
| 8/14/91 | 6900 |
| 9/23/91 | 780 |
| 10/1/91 | 460 |
| 5/11/93 | 150 |
| 6/15/93 | 220 |
| 7/13/93 | 240 |
| 8/2/93 | 700 |
| 9/23/93 | 180 |
| 10/4/93 | 300 |
| 5/16/94 | 250 |
| 6/10/94 | 9300 |
| 7/14/94 | 310 |
| 8/19/94 | 540 |
| 10/15/94 | 350 |
| 5/8/95 | 6000 |
| 6/8/95 | 560 |
| 7/17/95 | 4500 |
| 8/8/95 | 9400 |
| 9/13/95 | 340 |
| 10/9/95 | 480 |
| 5/28/96 | 3100 |

| B-019 | Value |
|---|---|
| 6/26/96 | 9000 |
| 7/30/96 | 5100 |
| 8/20/96 | 540 |
| 9/17/96 | 4500 |
| 10/23/96 | 80 |
| 5/29/97 | 330 |
| 6/13/97 | 14000 |
| 7/29/97 | 880 |
| 8/13/97 | 690 |
| 9/23/97 | 2000 |
| 10/7/97 | 230 |
| 5/5/98 | 330 |
| 6/25/98 | 400 |
| 7/21/98 | 380 |
| 8/6/98 | 520 |
| 9/9/98 | 1600 |
| 10/7/98 | 3600 |
| 5/4/99 | 660 |
| 6/7/99 | 2700 |
| 7/19/99 | 140000 |
| 8/24/99 | 6100 |
| 9/27/99 | 73000 |
| 10/4/99 | 58000 |
| 5/16/00 | 800 |
| 6/20/00 | 180 |
| 7/26/00 | 760 |
| 8/22/00 | 490 |
| 9/12/00 | 440 |
| 10/3/00 | 290 |

Table A-3 (Continued)

| B-020 | Value |
|---|---|
| 5/10/90 | 17000 |
| 6/6/90 | 11000 |
| 7/25/90 | 950000 |
| 8/9/90 | 23000 |
| 9/6/90 | 2500 |
| 10/4/90 | 7600 |
| 5/3/91 | 1300 |
| 6/3/91 | 2900 |
| 7/19/91 | 1500 |
| 8/9/91 | 2400 |
| 9/12/91 | 4200 |
| 10/2/91 | 2500 |
| 5/19/93 | 12000 |
| 6/9/93 | 5300 |
| 7/22/93 | 12000 |
| 8/6/93 | 9000 |
| 9/8/93 | 2600 |
| 10/8/93 | 1900 |
| 5/12/94 | 4500 |
| 6/15/94 | 99000 |
| 7/28/94 | 100000 |
| 8/25/94 | 62000 |
| 9/8/94 | 20000 |
| 10/11/94 | 9600 |
| 5/10/95 | 160000 |
| 6/22/95 | 13000 |
| 7/24/95 | 4E+06 |
| 8/1/95 | 11000 |
| 9/5/95 | 6900 |

| B-020 | Value |
|---|---|
| 10/5/95 | 47000 |
| 5/24/96 | 17000 |
| 6/14/96 | 2100 |
| 7/19/96 | 5400 |
| 8/22/96 | 2800 |
| 9/26/96 | 3800 |
| 10/29/96 | 1300 |
| 5/1/97 | 1800 |
| 6/5/97 | 1000 |
| 7/29/97 | 2100 |
| 8/20/97 | 16000 |
| 9/9/97 | 3200 |
| 10/6/97 | 2000 |
| 6/18/98 | 1400 |
| 7/17/98 | 19000 |
| 8/6/98 | 4600 |
| 9/8/98 | 5800 |
| 10/6/98 | 2700 |
| 5/27/99 | 2500 |
| 6/30/99 | 6000 |
| 7/27/99 | 2200 |
| 8/26/99 | 14000 |
| 9/29/99 | 9100 |
| 10/26/99 | 2700 |
| 5/15/00 | 2800 |
| 6/19/00 | >600 |
| 7/25/00 | >600 |
| 8/21/00 | >600 |
| 9/11/00 | 3400 |
| 10/16/00 | 86000 |

Table A-3 (Continued)

| B-021 | Value |
|---|---|
| 1/3/90 | 50 |
| 2/8/90 | 22 |
| 3/1/90 | 37000 |
| 4/5/90 | 280 |
| 5/10/90 | 20000 |
| 6/6/90 | 220 |
| 7/25/90 | 17000 |
| 8/9/90 | 830 |
| 9/6/90 | 310 |
| 10/4/90 | 2300 |
| 11/2/90 | 90 |
| 12/4/90 | 60 |
| 1/4/91 | 260 |
| 2/7/91 | 120 |
| 3/8/91 | 1600 |
| 4/11/91 | 180 |
| 5/3/91 | 140 |
| 6/3/91 | 420 |
| 7/19/91 | 400 |
| 8/9/91 | 600 |
| 9/12/91 | 260 |
| 10/2/91 | 350 |
| 11/8/91 | 180 |
| 12/2/91 | 300 |
| 1/8/92 | 30 |
| 2/7/92 | 55 |
| 3/4/92 | 110 |
| 4/8/92 | 15 |
| 5/12/92 | 590 |
| 6/5/92 | 780 |
| 7/9/92 | 700 |
| 8/3/92 | 580 |
| 9/1/92 | 960 |
| 10/1/92 | 420 |
| 11/24/92 | 520 |
| 12/10/92 | 3200 |
| 1/8/93 | 4800 |
| 2/4/93 | 5 |
| 3/2/93 | 70 |
| 4/8/93 | 4000 |
| 5/19/93 | 980 |
| 6/9/93 | 700 |
| 7/22/93 | 10000 |

| B-021 | Value |
|---|---|
| 8/6/93 | 1000 |
| 9/8/93 | 540 |
| 10/8/93 | 1100 |
| 11/4/93 | 480 |
| 12/8/93 | 100 |
| 1/13/94 | 520 |
| 2/2/94 | 57 |
| 3/8/94 | 49 |
| 4/14/94 | 1200 |
| 5/12/94 | 420 |
| 6/15/94 | 2100 |
| 7/28/94 | 19000 |
| 8/25/94 | 2800 |
| 9/8/94 | 20000 |
| 10/11/94 | 2200 |
| 11/16/94 | 35 |
| 12/6/94 | 760 |
| 1/5/95 | 66 |
| 2/2/95 | 700 |
| 3/8/95 | 380 |
| 4/24/95 | 4000 |
| 5/10/95 | 4000 |
| 6/22/95 | 120000 |
| 7/24/95 | 200000 |
| 8/1/95 | 63000 |
| 9/5/95 | 600 |
| 10/5/95 | 37000 |
| 11/8/95 | 6300 |
| 12/7/95 | 2700 |
| 1/18/96 | 140 |
| 2/7/96 | 50 |
| 3/14/96 | 170 |
| 4/12/96 | 160 |
| 5/24/96 | 460 |
| 6/14/96 | 840 |
| 7/19/96 | 1500 |
| 8/22/96 | 780 |
| 9/26/96 | 570 |
| 10/29/96 | 240 |
| 11/22/96 | 1100 |
| 12/5/96 | 160 |
| 1/9/97 | 15000 |
| 2/6/97 | 100 |
| 3/5/97 | 180 |
| 4/1/97 | 100 |

| B-021 | Value |
|---|---|
| 5/1/97 | 290 |
| 6/5/97 | 560 |
| 7/29/97 | 1200 |
| 8/20/97 | 580 |
| 9/9/97 | 580 |
| 10/6/97 | 380 |
| 11/20/97 | 120 |
| 1/8/98 | 1200 |
| 1/8/98 | 1200 |
| 2/13/98 | 44 |
| 3/6/98 | 740 |
| 4/21/98 | 780 |
| 5/6/98 | 240 |
| 6/18/98 | 280 |
| 7/17/98 | 860 |
| 8/6/98 | 460 |
| 9/8/98 | 1200 |
| 10/6/98 | 1200 |
| 11/12/98 | 270 |
| 1/7/99 | 160 |
| 2/11/99 | 140 |
| 3/18/99 | 60 |
| 4/22/99 | 230 |
| 5/27/99 | 520 |
| 6/30/99 | 960 |
| 7/27/99 | 380 |
| 8/26/99 | 1800 |
| 9/29/99 | 37000 |
| 10/26/99 | 160 |
| 11/10/99 | 340 |
| 12/1/99 | 280 |
| 1/12/00 | 290 |
| 2/9/00 | *Present <QL |
| 3/9/00 | 110 |
| 4/25/00 | 2000 |
| 5/15/00 | 510 |
| 6/19/00 | *Present >QL |
| 7/25/00 | *Present >QL |
| 8/21/00 | 640 |
| 9/11/00 | 1100 |
| 10/16/00 | 3600 |
| 11/16/00 | 500 |
| 12/12/00 | 160 |

Table A-3 (Continued)

| B-051 | Value |
|---|---|
| 1/29/90 | 280 |
| 2/28/90 | 80 |
| 3/28/90 | 140 |
| 4/5/90 | 120 |
| 5/24/90 | 380 |
| 6/26/90 | 100 |
| 7/23/90 | 560 |
| 8/9/90 | 280 |
| 9/13/90 | 1600 |
| 10/15/90 | 680 |
| 11/27/90 | 120 |
| 12/10/90 | 160 |
| 1/2/91 | 370 |
| 2/4/91 | 140 |
| 3/4/91 | 2400 |
| 4/1/91 | 1800 |
| 5/24/91 | 220 |
| 6/20/91 | 480 |
| 7/22/91 | 170 |
| 8/12/91 | 3300 |
| 9/16/91 | 320 |
| 10/14/91 | 230 |
| 11/25/91 | 130 |
| 12/16/91 | 210 |
| 1/9/92 | 220 |
| 2/25/92 | 660 |
| 3/12/92 | 660 |
| 4/2/92 | 60 |
| 5/12/92 | 190 |
| 6/4/92 | 150 |
| 7/23/92 | 320 |
| 8/11/92 | 250 |
| 9/8/92 | 700 |
| 10/28/92 | 120 |
| 11/5/92 | 2000 |
| 12/1/92 | 190 |
| 1/26/93 | 380 |
| 2/18/93 | 250 |
| 3/24/93 | 1980 |
| 4/29/93 | 110 |
| 5/13/93 | 140 |
| 6/2/93 | 390 |

| B-051 | Value |
|---|---|
| 7/8/93 | 50 |
| 8/5/93 | 180 |
| 9/28/93 | 430 |
| 10/27/93 | 3300 |
| 11/2/93 | 330 |
| 12/16/93 | 1600 |
| 1/27/94 | 110 |
| 2/2/94 | 40 |
| 3/17/94 | 40 |
| 4/21/94 | 70 |
| 5/26/94 | 110 |
| 6/15/94 | 190 |
| 7/27/94 | 440 |
| 8/4/94 | 240 |
| 9/28/94 | 300 |
| 10/4/94 | 880 |
| 11/17/94 | 110 |
| 12/1/94 | 440 |
| 1/12/95 | 180 |
| 2/9/95 | 30 |
| 3/9/95 | 1300 |
| 4/27/95 | 150 |
| 5/23/95 | 450 |
| 6/15/95 | 700 |
| 7/11/95 | 200 |
| 8/17/95 | 250 |
| 9/6/95 | 280 |
| 10/24/95 | 210 |
| 11/2/95 | 600 |
| 12/7/95 | 360 |
| 1/30/96 | 330 |
| 2/27/96 | 150 |
| 3/6/96 | 5200 |
| 4/11/96 | 100 |
| 5/8/96 | 480 |
| 6/4/96 | 160 |
| 8/29/96 | 300 |
| 10/1/96 | 3300 |
| 11/12/96 | 390 |
| 12/4/96 | 580 |
| 1/14/97 | 280 |
| 2/27/97 | 90 |
| 3/20/97 | 620 |
| 4/8/97 | 320 |
| 5/20/97 | 190 |

| B-051 | Value |
|---|---|
| 6/3/97 | 480 |
| 7/15/97 | 250 |
| 8/26/97 | 280 |
| 9/2/97 | 320 |
| 10/7/97 | 330 |
| 11/20/97 | 95 |
| 12/11/97 | 510 |
| 1/8/98 | 4900 |
| 2/5/98 | 590 |
| 3/11/98 | 590 |
| 4/1/98 | 520 |
| 5/5/98 | 250 |
| 7/30/98 | 220 |
| 8/20/98 | 450 |
| 9/22/98 | 340 |
| 10/20/98 | 380 |
| 11/10/98 | 150 |
| 12/2/98 | 70 |
| 1/26/99 | 420 |
| 2/3/99 | 3600 |
| 3/23/99 | 240 |
| 4/6/99 | 110 |
| 5/19/99 | 70 |
| 6/17/99 | 160 |
| 7/14/99 | 430 |
| 8/10/99 | 3300 |
| 9/7/99 | *Present >QL |
| 11/3/99 | 640 |
| 11/13/99 | 2100 |
| 12/8/99 | 640 |
| 1/20/00 | 130 |
| 2/24/00 | 50 |
| 3/23/00 | 410 |
| 4/24/00 | 80 |
| 5/9/00 | 100 |
| 6/15/00 | 60 |
| 7/13/00 | 270 |
| 8/7/00 | 280 |
| 9/20/00 | 160 |
| 10/25/00 | 80 |
| 11/2/00 | 95 |
| 12/28/00 | 75 |

Table A-3 (Continued)

| B-067A | Value |
|---|---|
| 5/24/90 | 2600 |
| 6/26/90 | 780 |
| 7/23/90 | 20000 |
| 8/9/90 | 2000 |
| 9/13/90 | 20000 |
| 10/15/90 | 18000 |
| 5/24/91 | 260 |
| 6/20/91 | 730 |
| 7/22/91 | 300 |
| 8/12/91 | 10000 |
| 9/16/91 | 260 |
| 10/14/91 | 310 |
| 5/12/92 | 290 |
| 6/4/92 | 1700 |
| 7/23/92 | 410 |
| 8/11/92 | 380 |
| 9/8/92 | 190 |
| 10/28/92 | 720 |
| 5/13/93 | 290 |
| 6/2/93 | 130 |
| 7/8/93 | 360 |
| 8/5/93 | 230 |
| 9/28/93 | 160 |
| 10/27/93 | 210 |
| 5/26/94 | 260 |
| 6/15/94 | 6600 |
| 7/27/94 | 230 |
| 8/4/94 | 3300 |
| 9/28/94 | 360 |
| 10/4/94 | 1100 |
| 5/23/95 | 460 |

| B-067A | Value |
|---|---|
| 7/11/95 | 210 |
| 8/17/95 | 280 |
| 9/6/95 | 590 |
| 10/18/95 | 240 |
| 5/8/96 | 330 |
| 6/4/96 | 190 |
| 8/29/96 | 260 |
| 10/1/96 | 500 |
| 5/20/97 | 180 |
| 6/3/97 | 110 |
| 7/15/97 | 260 |
| 8/26/97 | 160 |
| 9/2/97 | 330 |
| 10/7/97 | 400 |
| 5/5/98 | 250 |
| 7/30/98 | 660 |
| 8/20/98 | 210 |
| 9/23/98 | 820 |
| 10/20/98 | 110 |
| 5/19/99 | 1000 |
| 6/17/99 | 840 |
| 7/14/99 | 900 |
| 8/10/99 | 1200 |
| 9/7/99 | 320 |
| 10/12/99 | 900 |
| 5/9/00 | 300 |
| 6/15/00 | 260 |
| 7/13/00 | 980 |
| 8/7/00 | 740 |
| 9/19/00 | 680 |
| 10/23/00 | 220 |

Table A-3 (Continued)

| B-067B | Value |
|---|---|
| 5/24/90 | 36000 |
| 6/26/90 | 800 |
| 7/23/90 | 200000 |
| 8/9/90 | 2000 |
| 9/13/90 | 20000 |
| 10/15/90 | 5200 |
| 5/23/91 | 370 |
| 6/20/91 | 660 |
| 7/22/91 | 420 |
| 8/12/91 | 10000 |
| 9/16/91 | 460 |
| 10/14/91 | 380 |
| 5/12/92 | 310 |
| 6/4/92 | 2600 |
| 7/23/92 | 760 |
| 8/11/92 | 210 |
| 9/8/92 | 360 |
| 10/28/92 | 540 |
| 5/13/93 | 350 |
| 6/2/93 | 590 |
| 7/8/93 | 550 |
| 8/5/93 | 510 |
| 9/28/93 | 400 |
| 10/27/93 | 980 |
| 5/26/94 | 170 |
| 6/15/94 | 620 |
| 7/27/94 | 650 |
| 8/4/94 | 3300 |
| 9/28/94 | 3000 |
| 10/4/94 | 3000 |
| 5/23/95 | 2400 |
| 6/15/95 | 1000 |

| B-067B | Value |
|---|---|
| 7/11/95 | 190 |
| 8/17/95 | 280 |
| 9/6/95 | 780 |
| 10/18/95 | 500 |
| 5/8/96 | 300 |
| 6/4/96 | 260 |
| 8/29/96 | 350 |
| 10/1/96 | 2200 |
| 5/20/97 | 2310 |
| 6/3/97 | 160 |
| 7/15/97 | 290 |
| 8/26/97 | 210 |
| 9/2/97 | 500 |
| 10/7/97 | 440 |
| 5/5/98 | 480 |
| 7/30/98 | 250 |
| 8/20/98 | 1200 |
| 9/23/98 | 530 |
| 10/20/98 | 60 |
| 5/19/99 | 990 |
| 6/17/99 | 320 |
| 7/14/99 | 1200 |
| 8/10/99 | 4000 |
| 9/7/99 | 1300 |
| 10/12/99 | 990 |
| 5/9/00 | 150 |
| 6/15/00 | 500 |
| 7/13/00 | 1100 |
| 8/7/00 | 760 |
| 9/19/00 | 600 |
| 10/23/00 | 120 |

Table A-3 (Continued)

| B-164 | Value |
|---|---|
| 5/10/90 | 14000 |
| 6/6/90 | 12 |
| 7/25/90 | 4000 |
| 8/9/90 | 270 |
| 9/6/90 | 92 |
| 10/4/90 | 410 |
| 5/3/91 | 140 |
| 6/3/91 | 3100 |
| 7/19/91 | 40 |
| 8/9/91 | 110 |
| 9/12/91 | 50 |
| 10/2/91 | 88 |
| 5/19/93 | 3900 |
| 6/9/93 | 540 |
| 7/22/93 | 1200 |
| 8/6/93 | 400 |
| 9/8/93 | 390 |
| 10/8/93 | 410 |
| 5/12/94 | 160 |
| 6/15/94 | 8600 |
| 7/28/94 | 40000 |
| 8/25/94 | 3700 |
| 9/8/94 | 5300 |
| 10/11/94 | 1800 |
| 5/10/95 | 9000 |
| 6/22/95 | 15000 |
| 7/24/95 | 5600 |
| 8/1/95 | 13000 |
| 9/5/95 | 310 |

| B-164 | Value |
|---|---|
| 10/5/95 | 6000 |
| 5/24/96 | 630 |
| 7/19/96 | 1200 |
| 8/22/96 | 320 |
| 9/26/96 | 280 |
| 10/29/96 | 190 |
| 5/1/97 | 400 |
| 6/5/97 | 230 |
| 7/29/97 | 5000 |
| 8/20/97 | 200 |
| 9/9/97 | 180 |
| 10/6/97 | 180 |
| 5/6/98 | 90 |
| 6/18/98 | 450 |
| 7/17/98 | 1200 |
| 8/6/98 | 590 |
| 9/8/98 | 1300 |
| 10/6/98 | 430 |
| 5/27/99 | 530 |
| 6/30/99 | 580 |
| 7/27/99 | 310 |
| 8/26/99 | 8700 |
| 9/29/99 | 3200 |
| 10/26/99 | *Present <QL |
| 5/15/00 | 980 |
| 6/19/00 | *Present >QL |
| 7/25/00 | *Present >QL |
| 8/21/00 | 3300 |
| 9/11/00 | 750 |
| 10/16/00 | 240 |

Table A-3 (Continued)

| B-199 | Value |
|---|---|
| 5/23/90 | 470 |
| 6/26/90 | 3000 |
| 7/19/90 | 1600 |
| 8/14/90 | 360 |
| 9/17/90 | 130 |
| 10/17/90 | 130 |
| 5/23/91 | 130 |
| 6/27/91 | 550 |
| 7/22/91 | 130 |
| 8/29/91 | 380 |
| 9/16/91 | 260 |
| 10/14/91 | 200 |
| 5/7/92 | 450 |
| 6/4/92 | 2600 |
| 7/30/92 | 470 |
| 8/19/92 | 130 |
| 9/8/92 | 3000 |
| 10/22/92 | 110 |
| 5/13/93 | 1100 |
| 6/8/93 | 560 |
| 7/7/93 | 320 |
| 8/5/93 | 1100 |
| 9/7/93 | 2000 |
| 10/19/93 | 360 |
| 5/19/94 | 420 |
| 6/16/94 | 640 |
| 7/6/94 | 2200 |
| 8/10/94 | 150 |
| 9/13/94 | 360 |
| 10/11/94 | 340 |
| 5/16/95 | 360 |

| B-199 | Value |
|---|---|
| 6/21/95 | 220 |
| 7/25/95 | 1200 |
| 8/22/95 | 370 |
| 9/5/95 | 330 |
| 10/24/95 | 300 |
| 5/23/96 | 540 |
| 7/1/96 | 5000 |
| 10/7/96 | 390 |
| 5/21/97 | 570 |
| 6/2/97 | 570 |
| 7/17/97 | 560 |
| 8/27/97 | 390 |
| 9/10/97 | 1900 |
| 10/23/97 | 550 |
| 5/20/98 | 1000 |
| 7/29/98 | 1100 |
| 8/24/98 | 390 |
| 9/28/98 | 570 |
| 10/14/98 | 240 |
| 5/18/99 | 1100 |
| 6/23/99 | 890 |
| 7/13/99 | 350 |
| 8/7/99 | 3300 |
| 9/8/99 | 720 |
| 10/13/99 | 3800 |
| 5/31/00 | 540 |
| 6/21/00 | 2200 |
| 7/13/00 | 1000 |
| 8/24/00 | 1300 |
| 9/13/00 | 820 |
| 10/18/00 | 460 |

Table A-3 (Continued)

| B-219 | Value |
|---|---|
| 5/29/90 | 4200 |
| 6/14/90 | 360 |
| 7/12/90 | 400 |
| 8/24/90 | 1400 |
| 9/26/90 | 330 |
| 10/11/90 | 660 |
| 5/21/91 | 300 |
| 6/14/91 | 160 |
| 7/23/91 | 220 |
| 8/15/91 | 880 |
| 9/13/91 | 210 |
| 10/10/91 | 600 |
| 5/18/93 | 220 |
| 6/8/93 | 310 |
| 7/21/93 | 400 |
| 8/5/93 | 840 |
| 9/7/93 | 280 |
| 10/4/93 | 510 |
| 5/5/94 | 430 |
| 6/23/94 | 540 |
| 7/12/94 | 1500 |
| 8/16/94 | 15000 |
| 9/22/94 | 380 |
| 10/13/94 | 3100 |
| 11/17/94 | 220 |
| 12/15/94 | 220 |
| 1/26/95 | 85 |
| 2/15/95 | 320 |
| 3/16/95 | 120 |
| 4/20/95 | 480 |
| 5/4/95 | 350 |
| 6/9/95 | 600 |
| 7/13/95 | 420 |
| 8/24/95 | 460 |
| 9/29/95 | 460 |
| 10/16/95 | 840 |
| 5/25/96 | 500 |
| 6/11/96 | 400 |
| 7/12/96 | 190 |
| 8/9/96 | 280 |
| 9/13/96 | 740 |

| B-219 | Value |
|---|---|
| 10/11/96 | 220 |
| 5/15/97 | 100 |
| 6/20/97 | 240 |
| 7/18/97 | 390 |
| 8/15/97 | 290 |
| 9/5/97 | 110 |
| 10/3/97 | 120 |
| 5/15/98 | 30 |
| 6/11/98 | 920 |
| 7/16/98 | 260 |
| 8/18/98 | 2200 |
| 10/7/98 | 760 |
| 11/17/98 | 300 |
| 12/10/98 | 50 |
| 1/6/99 | 760 |
| 2/4/99 | 180 |
| 3/25/99 | 5 |
| 4/21/99 | 25 |
| 5/3/99 | 210 |
| 6/8/99 | 10 |
| 7/20/99 | 10 |
| 8/31/99 | 5 |
| 9/22/99 | 20 |
| 10/25/99 | 20 |
| 5/16/00 | 10 |
| 6/20/00 | 70 |
| 7/26/00 | 100 |
| 8/22/00 | 20 |
| 9/12/00 | 20 |
| 10/3/00 | 26 |
| 1/17/01 | *Present <QL |
| 2/7/01 | 3 |
| 3/8/01 | 20 |
| 6/25/01 | 18 |
| 7/13/01 | 24 |
| 8/21/01 | 3 |
| 9/11/01 | 1 |
| 9/21/01 | 23 |
| 10/12/01 | 5 |
| 11/6/01 | 1 |
| 12/13/01 | 45 |

Table A-3 (Continued)

| B-235 | Value |
|---|---|
| 5/10/90 | 3500 |
| 6/6/90 | 360 |
| 7/25/90 | 16000 |
| 8/9/90 | 250 |
| 9/6/90 | 360 |
| 10/4/90 | 2100 |
| 5/3/91 | 1500 |
| 6/3/91 | 120 |
| 7/19/91 | 240 |
| 8/9/91 | 280 |
| 9/12/91 | 240 |
| 10/2/91 | 300 |
| 5/19/93 | 7300 |
| 6/9/93 | 760 |
| 7/22/93 | 210 |
| 8/6/93 | 360 |
| 9/8/93 | 300 |
| 10/8/93 | 100 |
| 5/12/94 | 400 |
| 6/15/94 | 240 |
| 7/28/94 | 540 |
| 8/25/94 | 800 |
| 9/8/94 | 220 |
| 10/11/94 | 500 |
| 5/10/95 | 2000 |
| 6/22/95 | 3000 |
| 7/24/95 | 360 |
| 8/1/95 | 3900 |
| 9/5/95 | 280 |
| 10/5/95 | 9400 |

| B-235 | Value |
|---|---|
| 5/24/96 | 290 |
| 6/14/96 | 820 |
| 7/19/96 | 210 |
| 8/22/96 | 180 |
| 9/26/96 | 400 |
| 10/29/96 | 540 |
| 5/1/97 | 310 |
| 6/5/97 | 400 |
| 7/31/97 | 1200 |
| 8/20/97 | 530 |
| 9/9/97 | 200 |
| 10/6/97 | 600 |
| 5/6/98 | 110 |
| 6/18/98 | 220 |
| 7/17/98 | 400 |
| 8/6/98 | 230 |
| 9/8/98 | 210 |
| 10/6/98 | 460 |
| 5/27/99 | 180 |
| 6/30/99 | 390 |
| 7/27/99 | 220 |
| 8/26/99 | 660 |
| 9/29/99 | 500 |
| 10/26/99 | 150 |
| 5/15/00 | 76 |
| 6/19/00 | 580 |
| 7/25/00 | 1800 |
| 8/21/00 | 600 |
| 9/11/00 | 240 |
| 10/16/00 | 240 |

Table A-3 (Continued)

| B-263 | Value |
|---|---|
| 5/29/90 | 850 |
| 6/14/90 | 190 |
| 7/12/90 | 320 |
| 8/24/90 | 420 |
| 9/26/90 | 160 |
| 10/11/90 | 740 |
| 5/21/91 | 640 |
| 6/14/91 | 560 |
| 7/23/91 | 120 |
| 8/15/91 | 270 |
| 9/13/91 | 35 |
| 10/10/91 | 150 |
| 5/18/93 | 140 |
| 6/8/93 | 110 |
| 7/21/93 | 170 |
| 8/5/93 | 240 |
| 9/7/93 | 170 |
| 10/4/93 | 540 |
| 5/5/94 | 260 |
| 6/23/94 | 740 |
| 7/12/94 | 300 |
| 8/16/94 | 940 |
| 9/22/94 | 130 |
| 10/13/94 | 2600 |
| 5/4/95 | 82 |
| 6/9/95 | 140 |
| 7/13/95 | 920 |
| 8/24/95 | 500 |
| 9/29/95 | 86 |
| 10/16/95 | 330 |

| B-263 | Value |
|---|---|
| 5/25/96 | 170 |
| 6/11/96 | 120 |
| 7/12/96 | 190 |
| 8/9/96 | 370 |
| 9/13/96 | 330 |
| 10/11/96 | 98 |
| 5/15/97 | 100 |
| 6/20/97 | 120 |
| 7/18/97 | 370 |
| 8/15/97 | 170 |
| 9/5/97 | 100 |
| 10/3/97 | 45 |
| 5/15/98 | 260 |
| 6/11/98 | 260 |
| 7/16/98 | 52 |
| 8/18/98 | 68 |
| 10/7/98 | 450 |
| 5/3/99 | 30 |
| 6/8/99 | 250 |
| 7/20/99 | 820 |
| 8/31/99 | 55 |
| 9/22/99 | 2100 |
| 10/25/99 | 10 |
| 5/16/00 | 540 |
| 6/20/00 | 75 |
| 7/26/00 | 80 |
| 8/22/00 | 90 |
| 9/12/00 | 90 |
| 10/3/00 | 70 |

Table A-3 (Continued)

| B-286 | Value |
|---|---|
| 5/23/90 | 320 |
| 6/26/90 | 390 |
| 7/19/90 | 1100 |
| 8/14/90 | 2200 |
| 9/17/90 | 400 |
| 10/17/90 | 240 |
| 5/24/91 | 460 |
| 6/27/91 | 400 |
| 7/22/91 | 280 |
| 8/29/91 | 980 |
| 9/16/91 | 1100 |
| 10/14/91 | 60 |
| 5/7/92 | 3100 |
| 6/4/92 | 1200 |
| 7/30/92 | 440 |
| 8/19/92 | 320 |
| 9/8/92 | 380 |
| 10/22/92 | 80 |
| 5/13/93 | 460 |
| 6/8/93 | 250 |
| 7/7/93 | 410 |
| 8/5/93 | 350 |
| 9/7/93 | 440 |
| 10/19/93 | 800 |
| 5/19/94 | 440 |
| 6/16/94 | 760 |
| 7/6/94 | 710 |
| 8/10/94 | 240 |
| 9/13/94 | 210 |
| 10/11/94 | 290 |
| 5/16/95 | 460 |

| B-286 | Value |
|---|---|
| 6/21/95 | 510 |
| 7/25/95 | 620 |
| 8/22/95 | 1200 |
| 9/5/95 | 250 |
| 10/24/95 | 220 |
| 5/23/96 | 130 |
| 7/1/96 | 280 |
| 10/7/96 | 200 |
| 5/21/97 | 310 |
| 6/2/97 | 4100 |
| 7/17/97 | 470 |
| 8/27/97 | 500 |
| 9/10/97 | 1200 |
| 10/23/97 | 80 |
| 5/20/98 | 300 |
| 7/29/98 | 260 |
| 8/24/98 | 820 |
| 9/28/98 | 150 |
| 10/14/98 | 1000 |
| 5/18/99 | 190 |
| 6/23/99 | 120 |
| 7/14/99 | 290 |
| 8/7/99 | 3300 |
| 9/8/99 | 1100 |
| 10/12/99 | 360 |
| 5/31/00 | 120 |
| 6/21/00 | 200 |
| 7/13/00 | 400 |
| 8/24/00 | 500 |
| 9/13/00 | 21000 |
| 10/18/00 | 480 |

Table A-3 (Continued)

| B-287 | Value |
|---|---|
| 5/23/90 | 460 |
| 6/26/90 | 970 |
| 7/19/90 | 1200 |
| 8/14/90 | 290 |
| 9/17/90 | 480 |
| 10/17/90 | 380 |
| 5/24/91 | 360 |
| 6/27/91 | 530 |
| 7/22/91 | 310 |
| 8/29/91 | 400 |
| 9/16/91 | 360 |
| 10/14/91 | 190 |
| 5/7/92 | 800 |
| 6/4/92 | 940 |
| 7/30/92 | 780 |
| 8/19/92 | 1800 |
| 9/8/92 | 230 |
| 10/22/92 | 220 |
| 5/13/93 | 305 |
| 6/8/93 | 530 |
| 7/7/93 | 150 |
| 8/5/93 | 2600 |
| 9/7/93 | 710 |
| 10/19/93 | 390 |
| 5/19/94 | 480 |
| 6/16/94 | 860 |
| 7/6/94 | 540 |
| 9/13/94 | 200 |
| 10/11/94 | 430 |
| 5/16/95 | 380 |
| 6/21/95 | 1200 |

| B-287 | Value |
|---|---|
| 7/25/95 | 900 |
| 8/22/95 | 1400 |
| 9/5/95 | 370 |
| 10/24/95 | 310 |
| 5/23/96 | 160 |
| 7/1/96 | 1300 |
| 10/7/96 | 290 |
| 5/21/97 | 280 |
| 6/2/97 | 520 |
| 7/17/97 | 440 |
| 8/27/97 | 550 |
| 9/10/97 | 1000 |
| 10/23/97 | 100 |
| 5/20/98 | 370 |
| 7/29/98 | 860 |
| 8/24/98 | 380 |
| 9/28/98 | 180 |
| 10/14/98 | 6600 |
| 6/23/99 | 410 |
| 5/18/99 | 400 |
| 10/12/99 | 790 |
| 9/8/99 | 540 |
| 8/9/99 | 1600 |
| 7/14/99 | 370 |
| 10/18/00 | 200 |
| 9/13/00 | 790 |
| 8/24/00 | 230 |
| 7/13/00 | 380 |
| 6/21/00 | 520 |
| 5/31/00 | 240 |

Table A-3 (Continued)

| B-315 | Value |
|---|---|
| 5/29/90 | 580 |
| 6/14/90 | 840 |
| 7/12/90 | 450 |
| 8/24/90 | 2500 |
| 9/26/90 | 460 |
| 10/11/90 | 920 |
| 5/21/91 | 90 |
| 6/14/91 | 240 |
| 7/23/91 | 460 |
| 8/15/91 | 1100 |
| 9/13/91 | 660 |
| 10/10/91 | 50 |
| 5/18/93 | 390 |
| 6/8/93 | 490 |
| 7/21/93 | 240 |
| 8/5/93 | 50 |
| 9/7/93 | 1000 |
| 10/4/93 | 800 |
| 5/5/94 | 1800 |
| 5/13/94 | 230 |
| 6/23/94 | 280 |
| 7/12/94 | 1500 |
| 8/16/94 | 1700 |
| 9/22/94 | 100 |

| B-315 | Value |
|---|---|
| 10/13/94 | 140 |
| 5/4/95 | 110 |
| 6/9/95 | 800 |
| 7/13/95 | 820 |
| 8/24/95 | 410 |
| 9/29/95 | 140 |
| 10/16/95 | 170 |
| 5/24/96 | 860 |
| 6/11/96 | 410 |
| 7/12/96 | 760 |
| 8/9/96 | 680 |
| 9/13/96 | 2400 |
| 10/11/96 | 480 |
| 5/15/97 | 1400 |
| 6/20/97 | 230 |
| 7/18/97 | 1800 |
| 8/15/97 | 320 |
| 9/5/97 | 420 |
| 5/15/98 | 340 |
| 6/11/98 | 960 |
| 7/16/98 | 500 |
| 8/18/98 | 920 |
| 10/7/98 | 1200 |
| 5/15/98 | 340 |

Table A-3 (Continued)

| B-317 | Value |
|---|---|
| 1/4/90 | 140 |
| 2/1/90 | 45 |
| 3/8/90 | 76 |
| 4/11/90 | 1000 |
| 5/31/90 | 660 |
| 6/6/90 | 340 |
| 7/19/90 | 2200 |
| 8/16/90 | 610 |
| 9/17/90 | 530 |
| 10/3/90 | 250 |
| 11/2/90 | 105 |
| 12/7/90 | 90 |
| 1/2/91 | 86 |
| 2/1/91 | 46 |
| 3/1/91 | 54 |
| 4/4/91 | 250 |
| 5/10/91 | 120 |
| 6/7/91 | 130 |
| 7/25/91 | 1700 |
| 8/9/91 | 260 |
| 9/13/91 | 290 |
| 10/23/91 | 140 |
| 11/14/91 | 120 |
| 12/5/91 | 500 |
| 1/2/92 | 210 |
| 2/14/92 | 150 |
| 3/2/92 | 90 |
| 4/6/92 | 120 |
| 5/15/92 | 260 |
| 6/17/92 | 300 |
| 7/17/92 | 390 |
| 9/3/92 | 360 |
| 10/5/92 | 1100 |
| 11/5/92 | 750 |
| 12/14/92 | 100 |
| 1/21/93 | 1700 |
| 2/19/93 | 90 |
| 3/18/93 | 45 |
| 4/22/93 | 69 |
| 5/24/93 | 130 |
| 6/18/93 | 510 |
| 7/16/93 | 360 |
| 8/13/93 | 1600 |
| 9/17/93 | 310 |

| B-317 | Value |
|---|---|
| 10/21/93 | 480 |
| 11/18/93 | 160 |
| 12/16/93 | 400 |
| 1/20/94 | 37 |
| 2/25/94 | 380 |
| 3/18/94 | 140 |
| 4/14/94 | 420 |
| 5/19/94 | 160 |
| 6/10/94 | 4700 |
| 7/15/94 | 240 |
| 8/26/94 | 190 |
| 9/23/94 | 460 |
| 10/31/94 | 77 |
| 11/22/94 | 40 |
| 12/16/94 | 120 |
| 1/19/95 | 200 |
| 2/27/95 | 35 |
| 3/24/95 | 420 |
| 4/14/95 | 210 |
| 5/18/95 | 1100 |
| 6/15/95 | 320 |
| 7/20/95 | 1700 |
| 8/10/95 | 240 |
| 9/21/95 | 280 |
| 10/18/95 | 280 |
| 11/21/95 | 35 |
| 12/14/95 | 71 |
| 1/25/96 | 100 |
| 2/15/96 | 40 |
| 3/22/96 | 68 |
| 4/25/96 | 110 |
| 5/23/96 | 560 |
| 6/27/96 | 320 |
| 7/25/96 | 500 |
| 8/22/96 | 860 |
| 9/26/96 | 420 |
| 10/24/96 | 130 |
| 11/21/96 | 83 |
| 12/12/96 | 30 |
| 1/2/97 | 80 |
| 2/27/97 | 140 |
| 3/27/97 | 220 |
| 4/17/97 | 210 |

| B-317 | Value |
|---|---|
| 5/22/97 | 69 |
| 6/30/97 | 230 |
| 7/17/97 | 260 |
| 8/21/97 | 1700 |
| 9/11/97 | 1700 |
| 10/16/97 | 330 |
| 11/20/97 | 30 |
| 12/11/97 | 45 |
| 1/7/98 | 450 |
| 3/26/98 | 77 |
| 4/23/98 | 610 |
| 5/28/98 | 170 |
| 7/30/98 | 600 |
| 8/19/98 | 390 |
| 9/21/98 | 320 |
| 10/29/98 | 440 |
| 11/19/98 | 280 |
| 12/9/98 | 460 |
| 1/14/99 | 130 |
| 2/11/99 | 200 |
| 3/4/99 | 320 |
| 4/29/99 | 100 |
| 5/13/99 | 260 |
| 6/10/99 | 300 |
| 7/13/99 | 420 |
| 8/19/99 | 1400 |
| 9/30/99 | 320 |
| 10/14/99 | 260 |
| 11/18/99 | 130 |
| 12/9/99 | 120 |
| 1/13/00 | 180 |
| 2/17/00 | 190 |
| 3/16/00 | 270 |
| 4/13/00 | 1300 |
| 5/11/00 | 1200 |
| 6/8/00 | 260 |
| 7/13/00 | 830 |
| 8/10/00 | 470 |
| 9/14/00 | 280 |
| 10/19/00 | 250 |
| 11/2/00 | 240 |
| 12/7/00 | 160 |

Table A-3 (Continued)

| B-321 | Value |
|---|---|
| 1/3/90 | 15 |
| 2/8/90 | 54 |
| 3/1/90 | 36 |
| 4/5/90 | 22 |
| 5/29/90 | 7800 |
| 6/14/90 | 9900 |
| 7/12/90 | 38000 |
| 8/24/90 | 2000 |
| 9/26/90 | 1100 |
| 10/11/90 | 43000 |
| 11/2/90 | 300 |
| 12/4/90 | 210 |
| 1/4/91 | 310 |
| 2/7/91 | 160 |
| 3/8/91 | 910 |
| 4/11/91 | 350 |
| 5/21/91 | 380 |
| 6/14/91 | 1400 |
| 7/23/91 | 480 |
| 8/15/91 | 2100 |
| 9/13/91 | 9900 |
| 10/10/91 | 3400 |
| 11/8/91 | 480 |
| 12/2/91 | 250 |
| 1/8/92 | 60 |
| 2/7/92 | 90 |
| 3/4/92 | 300 |
| 4/8/92 | 110 |
| 5/12/92 | 510 |
| 6/5/92 | 1300 |
| 7/9/92 | 210 |
| 8/3/92 | 3700 |
| 9/1/92 | 8700 |
| 10/1/92 | 220 |
| 11/24/92 | 1800 |
| 12/10/92 | 2000 |
| 1/8/93 | 560 |
| 2/4/93 | 10 |
| 3/2/93 | 30 |
| 4/8/93 | 25 |
| 5/18/93 | 84 |
| 6/8/93 | 530 |

| B-321 | Value |
|---|---|
| 7/21/93 | 3600 |
| 8/5/93 | 530 |
| 9/7/93 | 2900 |
| 10/4/93 | 430 |
| 11/4/93 | 97 |
| 12/8/93 | 50 |
| 1/13/94 | 60 |
| 2/2/94 | 35 |
| 3/8/94 | 5 |
| 4/14/94 | 120 |
| 5/5/94 | 440 |
| 6/23/94 | 930 |
| 7/12/94 | 9600 |
| 8/16/94 | 8500 |
| 9/22/94 | 210 |
| 10/13/94 | 3500 |
| 11/17/94 | 220 |
| 12/15/94 | 71 |
| 1/26/95 | 55 |
| 2/15/95 | 1800 |
| 3/16/95 | 97 |
| 4/20/95 | 1000 |
| 5/4/95 | 360 |
| 6/9/95 | 1600 |
| 7/13/95 | 900 |
| 8/24/95 | 8100 |
| 9/29/95 | 260 |
| 10/16/95 | 550 |
| 11/8/95 | 190 |
| 12/7/95 | 560 |
| 1/18/96 | 180 |
| 2/7/96 | 5 |
| 3/14/96 | 15 |
| 4/12/96 | 64 |
| 5/24/96 | 1400 |
| 6/11/96 | 420 |
| 7/12/96 | 300 |
| 8/9/96 | 830 |
| 9/13/96 | 1300 |
| 10/11/96 | 430 |
| 11/22/96 | 100 |
| 12/5/96 | 68 |
| 1/9/97 | 3200 |
| 2/6/97 | 73 |
| 3/5/97 | 35 |
| 4/1/97 | 100 |

| B-321 | Value |
|---|---|
| 5/15/97 | 370 |
| 6/19/97 | 270 |
| 7/25/97 | 1100 |
| 8/22/97 | 6000 |
| 9/12/97 | 330 |
| 10/22/97 | 60000 |
| 11/20/97 | 20 |
| 1/8/98 | 760 |
| 2/13/98 | 260 |
| 3/6/98 | 77 |
| 4/3/98 | 600 |
| 5/5/98 | 1 |
| 6/26/98 | 200 |
| 8/19/98 | 1500 |
| 9/16/98 | 1700 |
| 10/20/98 | 200 |
| 11/17/98 | 180 |
| 12/10/98 | 800 |
| 2/13/98 | 260 |
| 1/6/99 | 250 |
| 2/4/99 | 140 |
| 3/25/99 | 140 |
| 4/21/99 | 200 |
| 5/5/99 | 60 |
| 6/10/99 | 700 |
| 7/15/99 | 880 |
| 8/5/99 | 240 |
| 9/14/99 | 1200 |
| 10/20/99 | 7300 |
| 11/10/99 | 290 |
| 12/1/99 | 50 |
| 1/12/00 | 140 |
| 2/9/00 | 30 |
| 3/9/00 | 50 |
| 4/25/00 | 330 |
| 5/15/00 | *Present >QL |
| 7/25/00 | *Present >QL |
| 8/21/00 | *Present >QL |
| 9/11/00 | 2100 |
| 10/16/00 | 7100 |
| 11/16/00 | 3300 |
| 12/12/00 | 1900 |

Table A-3 (Continued)

| B-332 | Value |
|---|---|
| 11/16/1994 | 25 |
| 12/6/1994 | 380 |
| 1/5/1995 | 340 |
| 2/2/1995 | 140 |
| 3/8/1995 | 64 |
| 4/24/1995 | 300 |
| 5/31/1995 | 200 |
| 6/9/1995 | 250 |
| 7/13/1995 | 240 |
| 8/24/1995 | 210 |
| 9/29/1995 | 190 |
| 10/16/1995 | 490 |
| 11/12/1998 | 400 |
| 12/16/1998 | 1100 |
| 1/7/1999 | 97 |
| 2/11/1999 | 140 |
| 3/18/1999 | 62 |
| 4/22/1999 | 160 |
| 5/4/1999 | 110 |
| 6/7/1999 | 130 |
| 7/19/1999 | 220 |
| 8/24/1999 | 490 |
| 9/27/1999 | 340 |
| 10/4/1999 | 5000 |
| 2/7/2001 | 100 |
| 3/8/2001 | 32 |
| 7/12/2001 | 200 |
| 8/16/2001 | 350 |
| 9/21/2001 | 210 |
| 9/21/2001 | 430 |
| 10/10/2001 | 87 |
| 11/5/2001 | 100 |
| 12/13/2001 | 370 |

| B-336 | Value |
|---|---|
| 11/17/1994 | 240 |
| 12/1/1994 | 490 |
| 1/12/1995 | 220 |
| 2/9/1995 | 120 |
| 3/9/1995 | 140 |
| 4/27/1995 | 520 |
| 5/23/1995 | 990 |
| 6/15/1995 | 520 |
| 7/11/1995 | 1000 |
| 8/17/1995 | 420 |
| 9/6/1995 | 550 |
| 10/24/1995 | 600 |
| 5/5/1998 | 480 |
| 11/4/1998 | 310 |
| 12/10/1998 | 140 |
| 1/18/1999 | 770 |
| 2/2/1999 | 820 |
| 3/13/1999 | 150 |
| 4/7/1999 | 180 |
| 5/19/1999 | 800 |
| 6/17/1999 | 410 |
| 7/14/1999 | 470 |
| 8/10/1999 | 3300 |
| 9/7/1999 | 840 |
| 11/13/1999 | 1100 |

Table A-3 (Continued)

| BF-007 | Value |
|---|---|
| 5/23/90 | 280 |
| 6/26/90 | 800 |
| 7/19/90 | 1700 |
| 8/14/90 | 50 |
| 9/17/90 | 55 |
| 10/17/90 | 120 |
| 5/24/91 | 180 |
| 6/27/91 | 85 |
| 7/22/91 | 120 |
| 8/29/91 | 1900 |
| 9/16/91 | 180 |
| 10/14/91 | 200 |
| 5/7/92 | 560 |
| 6/4/92 | 880 |
| 7/30/92 | 210 |
| 8/19/92 | 210 |
| 9/8/92 | 160 |
| 10/22/92 | 70 |
| 5/13/93 | 290 |
| 6/8/93 | 180 |
| 7/7/93 | 150 |
| 8/5/93 | 240 |
| 9/7/93 | 10 |
| 10/19/93 | 290 |
| 5/19/94 | 90 |
| 6/16/94 | 360 |
| 7/6/94 | 2500 |
| 8/10/94 | 60 |
| 9/13/94 | 310 |
| 10/11/94 | 570 |
| 5/16/95 | 1400 |
| 6/21/95 | 2200 |
| 7/25/95 | 80 |
| 8/22/95 | 360 |
| 9/5/95 | 250 |
| 10/24/95 | 330 |

| BF-007 | Value |
|---|---|
| 5/23/96 | 240 |
| 7/1/96 | 230 |
| 10/7/96 | 280 |
| 6/2/97 | 60 |
| 7/17/97 | 6600 |
| 8/27/97 | 250 |
| 9/10/97 | 2200 |
| 10/23/97 | 220 |
| 5/20/98 | 260 |
| 7/29/98 | 410 |
| 8/24/98 | 330 |
| 9/28/98 | 310 |
| 10/14/98 | 330 |
| 5/18/99 | 180 |
| 6/23/99 | 220 |
| 7/13/99 | 2500 |
| 8/7/99 | 3300 |
| 9/8/99 | 380 |
| 10/13/99 | 3400 |
| 5/31/00 | 400 |
| 6/21/00 | 140 |
| 7/13/00 | 13000 |
| 8/24/00 | 210 |
| 9/13/00 | 220 |
| 10/18/00 | 130 |
| 1/9/01 | 450 |
| 2/7/01 | 100 |
| 3/21/01 | 4800 |
| 4/2/01 | 270 |
| 5/7/01 | 100 |
| 6/19/01 | 200 |
| 7/30/01 | 150 |
| 8/8/01 | 100 |
| 9/10/01 | 230 |
| 10/9/01 | 140 |
| 11/14/01 | 120 |
| 12/4/01 | 55 |

Table A-3 (Continued)

| BF-008 | Value |
|---|---|
| 5/24/90 | 200 |
| 6/26/90 | 150 |
| 7/23/90 | 580 |
| 8/9/90 | 480 |
| 9/13/90 | 5000 |
| 10/15/90 | 1200 |
| 5/23/91 | 140 |
| 6/20/91 | 800 |
| 7/22/91 | 300 |
| 8/12/91 | 6600 |
| 9/16/91 | 180 |
| 10/14/91 | 110 |
| 5/12/92 | 280 |
| 6/4/92 | 270 |
| 7/23/92 | 760 |
| 8/11/92 | 170 |
| 9/8/92 | 300 |
| 10/28/92 | 330 |
| 5/13/93 | 100 |
| 6/2/93 | 280 |
| 7/8/93 | 310 |
| 8/5/93 | 390 |
| 9/28/93 | 360 |
| 10/27/93 | 420 |
| 5/26/94 | 280 |
| 6/15/94 | 1300 |
| 7/27/94 | 210 |
| 8/4/94 | 330 |
| 9/28/94 | 270 |
| 10/4/94 | 1900 |
| 11/17/94 | 150 |
| 12/1/94 | 230 |
| 1/12/95 | 140 |
| 2/9/95 | 40 |
| 3/9/95 | 2400 |
| 4/27/95 | 140 |
| 5/23/95 | 210 |
| 6/15/95 | 290 |
| 7/11/95 | 270 |
| 8/17/95 | 420 |
| 9/6/95 | 460 |
| 10/24/95 | 270 |
| 5/8/96 | 270 |

| BF-008 | Value |
|---|---|
| 6/4/96 | 350 |
| 8/29/96 | 230 |
| 10/1/96 | 3300 |
| 5/20/97 | 260 |
| 6/3/97 | 340 |
| 7/15/97 | 300 |
| 8/26/97 | 410 |
| 9/2/97 | 230 |
| 10/7/97 | 2400 |
| 5/5/98 | 240 |
| 7/30/98 | 250 |
| 8/20/98 | 400 |
| 9/22/98 | 400 |
| 10/20/98 | 300 |
| 11/4/98 | 760 |
| 12/10/98 | 180 |
| 1/18/99 | 1500 |
| 2/2/99 | 3500 |
| 3/23/99 | 380 |
| 5/19/99 | 200 |
| 6/17/99 | 330 |
| 7/15/99 | 410 |
| 8/10/99 | 3300 |
| 9/7/99 | 540 |
| 10/12/99 | 3800 |
| 5/9/00 | 240 |
| 6/15/00 | 200 |
| 7/13/00 | 800 |
| 8/7/00 | 340 |
| 9/19/00 | 330 |
| 10/25/00 | 70 |
| 1/9/01 | 300 |
| 2/7/01 | 65 |
| 3/21/01 | 2000 |
| 4/4/01 | 10 |
| 5/7/01 | 95 |
| 6/19/01 | 88 |
| 7/30/01 | 340 |
| 8/8/01 | 290 |
| 9/10/01 | 200 |
| 10/9/01 | 410 |
| 11/14/01 | 95 |
| 12/4/01 | 82 |

# APPENDIX B Calculations

Table B-1 TMDL Target Loads

| Station | B-317 |
|---|---|
| **Instantaneous Conc. (#/100 ml)** | **380** |
| **Geo. Mean Conc. (#/100 ml)** | **190** |

| | |
|---|---|
| **Mean** | 8.33E+10 |
| **Allowable Load (#/day)** | 8.33E+10 |
| **Geometric Mean Load (#/30days)** | 1.25E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 2.06E+11 |
| 15 | 1.70E+11 |
| 20 | 1.45E+11 |
| 25 | 1.21E+11 |
| 30 | 1.09E+11 |
| 35 | 9.69E+10 |
| 40 | 9.08E+10 |
| 45 | 7.87E+10 |
| 50 | 7.27E+10 |
| 55 | 6.05E+10 |
| 60 | 5.57E+10 |
| 65 | 4.96E+10 |
| 70 | 4.42E+10 |
| 75 | 3.81E+10 |
| 80 | 3.21E+10 |
| 85 | 2.60E+10 |
| 90 | 2.06E+10 |

| Station | B-336 |
|---|---|
| **Instantaneous Conc. (#/100 ml)** | **380** |
| **Geo. Mean Conc. (#/100 ml)** | **190** |

| | |
|---|---|
| **Mean** | 1.28E+11 |
| **Allowable Load (#/day)** | 1.28E+11 |
| **Geometric Mean Load (#/30days)** | 1.92E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 3.17E+11 |
| 15 | 2.61E+11 |
| 20 | 2.23E+11 |
| 25 | 1.86E+11 |
| 30 | 1.68E+11 |
| 35 | 1.49E+11 |
| 40 | 1.40E+11 |
| 45 | 1.21E+11 |
| 50 | 1.12E+11 |
| 55 | 9.31E+10 |
| 60 | 8.57E+10 |
| 65 | 7.64E+10 |
| 70 | 6.80E+10 |
| 75 | 5.87E+10 |
| 80 | 4.94E+10 |
| 85 | 4.00E+10 |
| 90 | 3.17E+10 |

| Station | BF-007 |
|---|---|
| **Instantaneous Conc. (#/100 ml)** | **380** |
| **Geo. Mean Conc. (#/100 ml)** | **190** |

| | |
|---|---|
| **Mean** | 2.79E+11 |
| **Allowable Load (#/day)** | 2.79E+11 |
| **Geometric Mean Load (#/30days)** | 4.18E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 6.89E+11 |
| 15 | 5.68E+11 |
| 20 | 4.86E+11 |
| 25 | 4.05E+11 |
| 30 | 3.65E+11 |
| 35 | 3.24E+11 |
| 40 | 3.04E+11 |
| 45 | 2.63E+11 |
| 50 | 2.43E+11 |
| 55 | 2.03E+11 |
| 60 | 1.86E+11 |
| 65 | 1.66E+11 |
| 70 | 1.48E+11 |
| 75 | 1.28E+11 |
| 80 | 1.07E+11 |
| 85 | 8.72E+10 |
| 90 | 6.89E+10 |

Table B-1 (Continued)

| Station | BF-008 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 4.87E+11 |
| Allowable Load (#/day) | 4.87E+11 |
| Geometric Mean Load (#/30days) | 7.31E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.20E+12 |
| 15 | 9.91E+11 |
| 20 | 8.49E+11 |
| 25 | 7.08E+11 |
| 30 | 6.37E+11 |
| 35 | 5.66E+11 |
| 40 | 5.31E+11 |
| 45 | 4.60E+11 |
| 50 | 4.25E+11 |
| 55 | 3.54E+11 |
| 60 | 3.26E+11 |
| 65 | 2.90E+11 |
| 70 | 2.58E+11 |
| 75 | 2.23E+11 |
| 80 | 1.88E+11 |
| 85 | 1.52E+11 |
| 90 | 1.20E+11 |

| Station | B-199 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 3.97E+10 |
| Allowable Load (#/day) | 3.97E+10 |
| Geometric Mean Load (#/30days) | 5.96E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 7.66E+10 |
| 15 | 6.57E+10 |
| 20 | 5.47E+10 |
| 25 | 5.14E+10 |
| 30 | 4.81E+10 |
| 35 | 4.54E+10 |
| 40 | 4.21E+10 |
| 45 | 3.99E+10 |
| 50 | 3.78E+10 |
| 55 | 3.50E+10 |
| 60 | 3.28E+10 |
| 65 | 3.06E+10 |
| 70 | 2.79E+10 |
| 75 | 2.52E+10 |
| 80 | 2.30E+10 |
| 85 | 2.08E+10 |
| 90 | 1.86E+10 |

| Station | B-008 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 3.53E+12 |
| Allowable Load (#/day) | 3.53E+12 |
| Geometric Mean Load (#/30days) | 5.30E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 7.26E+12 |
| 15 | 5.99E+12 |
| 20 | 5.23E+12 |
| 25 | 4.72E+12 |
| 30 | 4.36E+12 |
| 35 | 4.07E+12 |
| 40 | 3.78E+12 |
| 45 | 3.49E+12 |
| 50 | 3.25E+12 |
| 55 | 2.98E+12 |
| 60 | 2.76E+12 |
| 65 | 2.55E+12 |
| 70 | 2.33E+12 |
| 75 | 2.18E+12 |
| 80 | 1.96E+12 |
| 85 | 1.74E+12 |
| 90 | 1.45E+12 |

Table B-1 (Continued)

| Station | B-012 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 7.33E+11 |
| Allowable Load (#/day) | 7.33E+11 |
| Geometric Mean Load (#/30days) | 1.10E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.51E+12 |
| 15 | 1.24E+12 |
| 20 | 1.08E+12 |
| 25 | 9.79E+11 |
| 30 | 9.04E+11 |
| 35 | 8.44E+11 |
| 40 | 7.83E+11 |
| 45 | 7.23E+11 |
| 50 | 6.75E+11 |
| 55 | 6.18E+11 |
| 60 | 5.73E+11 |
| 65 | 5.29E+11 |
| 70 | 4.84E+11 |
| 75 | 4.52E+11 |
| 80 | 4.07E+11 |
| 85 | 3.62E+11 |
| 90 | 3.01E+11 |

| Station | B-014 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 8.29E+11 |
| Allowable Load (#/day) | 8.29E+11 |
| Geometric Mean Load (#/30days) | 1.24E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.70E+12 |
| 15 | 1.40E+12 |
| 20 | 1.23E+12 |
| 25 | 1.11E+12 |
| 30 | 1.02E+12 |
| 35 | 9.53E+11 |
| 40 | 8.85E+11 |
| 45 | 8.17E+11 |
| 50 | 7.63E+11 |
| 55 | 6.98E+11 |
| 60 | 6.47E+11 |
| 65 | 5.98E+11 |
| 70 | 5.47E+11 |
| 75 | 5.11E+11 |
| 80 | 4.60E+11 |
| 85 | 4.09E+11 |
| 90 | 3.40E+11 |

| Station | B-018A |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 1.73E+12 |
| Allowable Load (#/day) | 1.73E+12 |
| Geometric Mean Load (#/30days) | 2.59E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 3.55E+12 |
| 15 | 2.93E+12 |
| 20 | 2.56E+12 |
| 25 | 2.31E+12 |
| 30 | 2.13E+12 |
| 35 | 1.99E+12 |
| 40 | 1.85E+12 |
| 45 | 1.70E+12 |
| 50 | 1.59E+12 |
| 55 | 1.46E+12 |
| 60 | 1.35E+12 |
| 65 | 1.25E+12 |
| 70 | 1.14E+12 |
| 75 | 1.07E+12 |
| 80 | 9.59E+11 |
| 85 | 8.52E+11 |
| 90 | 7.10E+11 |

Table B-1 (Continued)

| Station | B-219 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 3.48E+11 |
| Allowable Load (#/day) | 3.48E+11 |
| Geometric Mean Load (#/30days) | 5.22E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 7.14E+11 |
| 15 | 5.89E+11 |
| 20 | 5.14E+11 |
| 25 | 4.64E+11 |
| 30 | 4.29E+11 |
| 35 | 4.00E+11 |
| 40 | 3.71E+11 |
| 45 | 3.43E+11 |
| 50 | 3.20E+11 |
| 55 | 2.93E+11 |
| 60 | 2.71E+11 |
| 65 | 2.51E+11 |
| 70 | 2.29E+11 |
| 75 | 2.14E+11 |
| 80 | 1.93E+11 |
| 85 | 1.71E+11 |
| 90 | 1.43E+11 |

| Station | B-315 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 1.89E+11 |
| Allowable Load (#/day) | 1.89E+11 |
| Geometric Mean Load (#/30days) | 2.83E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 3.88E+11 |
| 15 | 3.20E+11 |
| 20 | 2.79E+11 |
| 25 | 2.52E+11 |
| 30 | 2.33E+11 |
| 35 | 2.17E+11 |
| 40 | 2.02E+11 |
| 45 | 1.86E+11 |
| 50 | 1.74E+11 |
| 55 | 1.59E+11 |
| 60 | 1.47E+11 |
| 65 | 1.36E+11 |
| 70 | 1.25E+11 |
| 75 | 1.16E+11 |
| 80 | 1.05E+11 |
| 85 | 9.31E+10 |
| 90 | 7.76E+10 |

| Station | B-332 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 1.44E+12 |
| Allowable Load (#/day) | 1.44E+12 |
| Geometric Mean Load (#/30days) | 2.16E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 2.96E+12 |
| 15 | 2.44E+12 |
| 20 | 2.13E+12 |
| 25 | 1.92E+12 |
| 30 | 1.78E+12 |
| 35 | 1.66E+12 |
| 40 | 1.54E+12 |
| 45 | 1.42E+12 |
| 50 | 1.33E+12 |
| 55 | 1.21E+12 |
| 60 | 1.12E+12 |
| 65 | 1.04E+12 |
| 70 | 9.51E+11 |
| 75 | 8.88E+11 |
| 80 | 7.99E+11 |
| 85 | 7.11E+11 |
| 90 | 5.92E+11 |

Table B-1 (Continued)

| Station | B-005 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 9.25E+11 |
| Allowable Load (#/day) | 9.25E+11 |
| Geometric Mean Load (#/30days) | 1.39E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 2.11E+12 |
| 15 | 1.67E+12 |
| 20 | 1.43E+12 |
| 25 | 1.27E+12 |
| 30 | 1.16E+12 |
| 35 | 1.06E+12 |
| 40 | 9.82E+11 |
| 45 | 9.00E+11 |
| 50 | 8.32E+11 |
| 55 | 7.57E+11 |
| 60 | 6.86E+11 |
| 65 | 6.20E+11 |
| 70 | 5.62E+11 |
| 75 | 5.08E+11 |
| 80 | 4.52E+11 |
| 85 | 3.93E+11 |
| 90 | 3.35E+11 |

| Station | B-051 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 7.22E+12 |
| Allowable Load (#/day) | 7.22E+12 |
| Geometric Mean Load (#/30days) | 1.08E+14 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.65E+13 |
| 15 | 1.30E+13 |
| 20 | 1.12E+13 |
| 25 | 9.95E+12 |
| 30 | 9.03E+12 |
| 35 | 8.26E+12 |
| 40 | 7.66E+12 |
| 45 | 7.02E+12 |
| 50 | 6.49E+12 |
| 55 | 5.90E+12 |
| 60 | 5.35E+12 |
| 65 | 4.83E+12 |
| 70 | 4.39E+12 |
| 75 | 3.96E+12 |
| 80 | 3.52E+12 |
| 85 | 3.07E+12 |
| 90 | 2.61E+12 |

| Station | B-263 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 7.65E+11 |
| Allowable Load (#/day) | 7.65E+11 |
| Geometric Mean Load (#/30days) | 1.15E+13 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.74E+12 |
| 15 | 1.38E+12 |
| 20 | 1.18E+12 |
| 25 | 1.05E+12 |
| 30 | 9.57E+11 |
| 35 | 8.76E+11 |
| 40 | 8.12E+11 |
| 45 | 7.44E+11 |
| 50 | 6.88E+11 |
| 55 | 6.26E+11 |
| 60 | 5.68E+11 |
| 65 | 5.13E+11 |
| 70 | 4.65E+11 |
| 75 | 4.20E+11 |
| 80 | 3.74E+11 |
| 85 | 3.25E+11 |
| 90 | 2.77E+11 |

Table B-1 (Continued)

| Station | B-019 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 4.18E+10 |
| Allowable Load (#/day) | 4.18E+10 |
| Geometric Mean Load (#/30days) | 6.28E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 9.69E+10 |
| 15 | 7.51E+10 |
| 20 | 6.46E+10 |
| 25 | 5.62E+10 |
| 30 | 5.06E+10 |
| 35 | 4.63E+10 |
| 40 | 4.28E+10 |
| 45 | 3.93E+10 |
| 50 | 3.65E+10 |
| 55 | 3.37E+10 |
| 60 | 3.09E+10 |
| 65 | 2.88E+10 |
| 70 | 2.67E+10 |
| 75 | 2.46E+10 |
| 80 | 2.18E+10 |
| 85 | 1.97E+10 |
| 90 | 1.69E+10 |

| Station | B-020 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 1.92E+11 |
| Allowable Load (#/day) | 1.92E+11 |
| Geometric Mean Load (#/30days) | 2.88E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 4.44E+11 |
| 15 | 3.44E+11 |
| 20 | 2.96E+11 |
| 25 | 2.57E+11 |
| 30 | 2.32E+11 |
| 35 | 2.12E+11 |
| 40 | 1.96E+11 |
| 45 | 1.80E+11 |
| 50 | 1.67E+11 |
| 55 | 1.54E+11 |
| 60 | 1.42E+11 |
| 65 | 1.32E+11 |
| 70 | 1.22E+11 |
| 75 | 1.13E+11 |
| 80 | 9.97E+10 |
| 85 | 9.01E+10 |
| 90 | 7.72E+10 |

| Station | B-021 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| | |
|---|---|
| Mean | 5.17E+11 |
| Allowable Load (#/day) | 5.17E+11 |
| Geometric Mean Load (#/30days) | 7.76E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.20E+12 |
| 15 | 9.29E+11 |
| 20 | 7.99E+11 |
| 25 | 6.94E+11 |
| 30 | 6.25E+11 |
| 35 | 5.73E+11 |
| 40 | 5.29E+11 |
| 45 | 4.86E+11 |
| 50 | 4.51E+11 |
| 55 | 4.17E+11 |
| 60 | 3.82E+11 |
| 65 | 3.56E+11 |
| 70 | 3.30E+11 |
| 75 | 3.04E+11 |
| 80 | 2.69E+11 |
| 85 | 2.43E+11 |
| 90 | 2.08E+11 |

Table B-1 (Continued)

| Station | B-067A |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 6.50E+10 |
| Allowable Load (#/day) | 6.50E+10 |
| Geometric Mean Load (#/30days) | 9.75E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.51E+11 |
| 15 | 1.17E+11 |
| 20 | 1.00E+11 |
| 25 | 8.73E+10 |
| 30 | 7.85E+10 |
| 35 | 7.20E+10 |
| 40 | 6.65E+10 |
| 45 | 6.11E+10 |
| 50 | 5.67E+10 |
| 55 | 5.24E+10 |
| 60 | 4.80E+10 |
| 65 | 4.47E+10 |
| 70 | 4.15E+10 |
| 75 | 3.82E+10 |
| 80 | 3.38E+10 |
| 85 | 3.05E+10 |
| 90 | 2.62E+10 |

| Station | B-067B |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 5.64E+10 |
| Allowable Load (#/day) | 5.64E+10 |
| Geometric Mean Load (#/30days) | 8.46E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.31E+11 |
| 15 | 1.01E+11 |
| 20 | 8.71E+10 |
| 25 | 7.57E+10 |
| 30 | 6.82E+10 |
| 35 | 6.25E+10 |
| 40 | 5.77E+10 |
| 45 | 5.30E+10 |
| 50 | 4.92E+10 |
| 55 | 4.54E+10 |
| 60 | 4.17E+10 |
| 65 | 3.88E+10 |
| 70 | 3.60E+10 |
| 75 | 3.31E+10 |
| 80 | 2.93E+10 |
| 85 | 2.65E+10 |
| 90 | 2.27E+10 |

| Station | B-164 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |
| Mean | 2.42E+11 |
| Allowable Load (#/day) | 2.42E+11 |
| Geometric Mean Load (#/30days) | 3.63E+12 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 5.61E+11 |
| 15 | 4.35E+11 |
| 20 | 3.74E+11 |
| 25 | 3.25E+11 |
| 30 | 2.93E+11 |
| 35 | 2.68E+11 |
| 40 | 2.48E+11 |
| 45 | 2.28E+11 |
| 50 | 2.11E+11 |
| 55 | 1.95E+11 |
| 60 | 1.79E+11 |
| 65 | 1.67E+11 |
| 70 | 1.54E+11 |
| 75 | 1.42E+11 |
| 80 | 1.26E+11 |
| 85 | 1.14E+11 |
| 90 | 9.76E+10 |

Table B-1 (Continued)

| Station | B-235 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| Mean | 4.81E+10 |
|---|---|
| Allowable Load (#/day) | 4.81E+10 |
| Geometric Mean Load (#/30days) | 7.21E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.11E+11 |
| 15 | 8.63E+10 |
| 20 | 7.42E+10 |
| 25 | 6.46E+10 |
| 30 | 5.81E+10 |
| 35 | 5.33E+10 |
| 40 | 4.92E+10 |
| 45 | 4.52E+10 |
| 50 | 4.20E+10 |
| 55 | 3.87E+10 |
| 60 | 3.55E+10 |
| 65 | 3.31E+10 |
| 70 | 3.07E+10 |
| 75 | 2.82E+10 |
| 80 | 2.50E+10 |
| 85 | 2.26E+10 |
| 90 | 1.94E+10 |

| Station | B-286 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| Mean | 3.52E+10 |
|---|---|
| Allowable Load (#/day) | 3.52E+10 |
| Geometric Mean Load (#/30days) | 5.27E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 8.14E+10 |
| 15 | 6.31E+10 |
| 20 | 5.43E+10 |
| 25 | 4.72E+10 |
| 30 | 4.25E+10 |
| 35 | 3.89E+10 |
| 40 | 3.60E+10 |
| 45 | 3.30E+10 |
| 50 | 3.07E+10 |
| 55 | 2.83E+10 |
| 60 | 2.60E+10 |
| 65 | 2.42E+10 |
| 70 | 2.24E+10 |
| 75 | 2.07E+10 |
| 80 | 1.83E+10 |
| 85 | 1.65E+10 |
| 90 | 1.42E+10 |

| Station | B-287 |
|---|---|
| Instantaneous Conc. (#/100 ml) | 380 |
| Geo. Mean Conc. (#/100 ml) | 190 |

| Mean | 4.72E+10 |
|---|---|
| Allowable Load (#/day) | 4.72E+10 |
| Geometric Mean Load (#/30days) | 7.07E+11 |

| Percent Exceedance (%) | Load(#/Day) |
|---|---|
| 10 | 1.09E+11 |
| 15 | 8.47E+10 |
| 20 | 7.28E+10 |
| 25 | 6.33E+10 |
| 30 | 5.70E+10 |
| 35 | 5.22E+10 |
| 40 | 4.83E+10 |
| 45 | 4.43E+10 |
| 50 | 4.12E+10 |
| 55 | 3.80E+10 |
| 60 | 3.48E+10 |
| 65 | 3.25E+10 |
| 70 | 3.01E+10 |
| 75 | 2.77E+10 |
| 80 | 2.45E+10 |
| 85 | 2.22E+10 |
| 90 | 1.90E+10 |

Table B-1 (Continued)

| Station | B-321 |
| ---: | :---: |
| **Instantaneous Conc. (#/100 ml)** | **380** |
| **Geo. Mean Conc. (#/100 ml)** | **190** |

| | |
| ---: | :---: |
| **Mean** | 5.98E+09 |
| **Allowable Load (#/day)** | 5.98E+09 |
| **Geometric Mean Load (#/30days)** | 8.97E+10 |

| Percent Exceedance (%) | Load(#/Day) |
| :---: | :---: |
| 10 | 1.38E+10 |
| 15 | 1.07E+10 |
| 20 | 9.23E+09 |
| 25 | 8.02E+09 |
| 30 | 7.22E+09 |
| 35 | 6.62E+09 |
| 40 | 6.12E+09 |
| 45 | 5.62E+09 |
| 50 | 5.22E+09 |
| 55 | 4.81E+09 |
| 60 | 4.41E+09 |
| 65 | 4.11E+09 |
| 70 | 3.81E+09 |
| 75 | 3.51E+09 |
| 80 | 3.11E+09 |
| 85 | 2.81E+09 |
| 90 | 2.41E+09 |

Table B-2 Existing Loads

| Station | B-317 |
|---|---|
| Trend Line: | Power |
| Equation: y=4E+12*x^(-0.9903) | |

| Existing Load (#/Day): | 1.21E+11 |
|---|---|
| Average (#/Day): | 1.21E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 4.09E+11 |
| 15 | 2.74E+11 |
| 20 | 2.06E+11 |
| 25 | 1.65E+11 |
| 30 | 1.38E+11 |
| 35 | 1.18E+11 |
| 40 | 1.04E+11 |
| 45 | 9.22E+10 |
| 50 | 8.31E+10 |
| 55 | 7.56E+10 |
| 60 | 6.94E+10 |
| 65 | 6.41E+10 |
| 70 | 5.95E+10 |
| 75 | 5.56E+10 |
| 80 | 5.22E+10 |
| 85 | 4.91E+10 |
| 90 | 4.64E+10 |

| Station | B-336 |
|---|---|
| Trend Line: | Power |
| Equation: y=7E+12*x^(-1.0355) | |

| Existing Load (#/Day): | 1.83E+11 |
|---|---|
| Average (#/Day): | 1.83E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 6.45E+11 |
| 15 | 4.24E+11 |
| 20 | 3.15E+11 |
| 25 | 2.50E+11 |
| 30 | 2.07E+11 |
| 35 | 1.76E+11 |
| 40 | 1.54E+11 |
| 45 | 1.36E+11 |
| 50 | 1.22E+11 |
| 55 | 1.10E+11 |
| 60 | 1.01E+11 |
| 65 | 9.29E+10 |
| 70 | 8.60E+10 |
| 75 | 8.01E+10 |
| 80 | 7.49E+10 |
| 85 | 7.03E+10 |
| 90 | 6.63E+10 |

| Station | BF-007 |
|---|---|
| Trend Line: | Power |
| Equation: y=2E+13*x^(-0.9281) | |

| Existing Load (#/Day): | 7.45E+11 |
|---|---|
| Average (#/Day): | 7.45E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 2.36E+12 |
| 15 | 1.62E+12 |
| 20 | 1.24E+12 |
| 25 | 1.01E+12 |
| 30 | 8.51E+11 |
| 35 | 7.38E+11 |
| 40 | 6.52E+11 |
| 45 | 5.84E+11 |
| 50 | 5.30E+11 |
| 55 | 4.85E+11 |
| 60 | 4.47E+11 |
| 65 | 4.15E+11 |
| 70 | 3.88E+11 |
| 75 | 3.64E+11 |
| 80 | 3.43E+11 |
| 85 | 3.24E+11 |
| 90 | 3.07E+11 |

Table B-2 (Continued)

| Station | BF-008 |
|---|---|
| Trend Line: | Power |
| Equation: y=2E+14*x^(-1.4497) | |

| Existing Load (#/Day): | 1.41E+12 |
|---|---|
| Average (#/Day): | 1.41E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 7.10E+12 |
| 15 | 3.95E+12 |
| 20 | 2.60E+12 |
| 25 | 1.88E+12 |
| 30 | 1.44E+12 |
| 35 | 1.16E+12 |
| 40 | 9.52E+11 |
| 45 | 8.02E+11 |
| 50 | 6.89E+11 |
| 55 | 6.00E+11 |
| 60 | 5.29E+11 |
| 65 | 4.71E+11 |
| 70 | 4.23E+11 |
| 75 | 3.83E+11 |
| 80 | 3.48E+11 |
| 85 | 3.19E+11 |
| 90 | 2.94E+11 |

| Station | B-199 |
|---|---|
| Trend Line: | Power |
| Equation: y=1E+12*x^(-0.7119) | |

| Existing Load (#/Day): | 7.73E+10 |
|---|---|
| Average (#/Day): | 7.73E+10 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.94E+11 |
| 15 | 1.45E+11 |
| 20 | 1.19E+11 |
| 25 | 1.01E+11 |
| 30 | 8.88E+10 |
| 35 | 7.96E+10 |
| 40 | 7.24E+10 |
| 45 | 6.65E+10 |
| 50 | 6.17E+10 |
| 55 | 5.77E+10 |
| 60 | 5.42E+10 |
| 65 | 5.12E+10 |
| 70 | 4.86E+10 |
| 75 | 4.63E+10 |
| 80 | 4.42E+10 |
| 85 | 4.23E+10 |
| 90 | 4.06E+10 |

| Station | B-008 |
|---|---|
| Trend Line: | Power |
| Equation: y=1E+14*x^(-0.7011) | |

| Existing Load (#/Day): | 8.04E+12 |
|---|---|
| Average (#/Day): | 8.04E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.99E+13 |
| 15 | 1.50E+13 |
| 20 | 1.23E+13 |
| 25 | 1.05E+13 |
| 30 | 9.24E+12 |
| 35 | 8.29E+12 |
| 40 | 7.55E+12 |
| 45 | 6.95E+12 |
| 50 | 6.46E+12 |
| 55 | 6.04E+12 |
| 60 | 5.69E+12 |
| 65 | 5.38E+12 |
| 70 | 5.10E+12 |
| 75 | 4.86E+12 |
| 80 | 4.65E+12 |
| 85 | 4.45E+12 |
| 90 | 4.28E+12 |

Table B-2 (Continued)

| Station | B-012 |
|---|---|
| Trend Line: | Power |
| Equation: y=1E+13*x^(-0.5619) | |

| Existing Load (#/Day): | 1.30E+12 |
|---|---|
| Average (#/Day): | 1.30E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 2.74E+12 |
| 15 | 2.18E+12 |
| 20 | 1.86E+12 |
| 25 | 1.64E+12 |
| 30 | 1.48E+12 |
| 35 | 1.36E+12 |
| 40 | 1.26E+12 |
| 45 | 1.18E+12 |
| 50 | 1.11E+12 |
| 55 | 1.05E+12 |
| 60 | 1.00E+12 |
| 65 | 9.58E+11 |
| 70 | 9.19E+11 |
| 75 | 8.84E+11 |
| 80 | 8.52E+11 |
| 85 | 8.24E+11 |
| 90 | 7.98E+11 |

| Station | B-014 |
|---|---|
| Trend Line: | Power |
| Equation: y=3E+14*x^(-1-4205) | |

| Existing Load (#/Day): | 2.31E+12 |
|---|---|
| Average (#/Day): | 2.31E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.14E+13 |
| 15 | 6.40E+12 |
| 20 | 4.26E+12 |
| 25 | 3.10E+12 |
| 30 | 2.39E+12 |
| 35 | 1.92E+12 |
| 40 | 1.59E+12 |
| 45 | 1.35E+12 |
| 50 | 1.16E+12 |
| 55 | 1.01E+12 |
| 60 | 8.94E+11 |
| 65 | 7.98E+11 |
| 70 | 7.18E+11 |
| 75 | 6.51E+11 |
| 80 | 5.94E+11 |
| 85 | 5.45E+11 |
| 90 | 5.02E+11 |

| Station | B-018A |
|---|---|
| Trend Line: | Power |
| Equation: y=4E+14*x^(-1.1562) | |

| Existing Load (#/Day): | 7.07E+12 |
|---|---|
| Average (#/Day): | 7.07E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 2.79E+13 |
| 15 | 1.75E+13 |
| 20 | 1.25E+13 |
| 25 | 9.68E+12 |
| 30 | 7.84E+12 |
| 35 | 6.56E+12 |
| 40 | 5.62E+12 |
| 45 | 4.90E+12 |
| 50 | 4.34E+12 |
| 55 | 3.89E+12 |
| 60 | 3.52E+12 |
| 65 | 3.21E+12 |
| 70 | 2.94E+12 |
| 75 | 2.72E+12 |
| 80 | 2.52E+12 |
| 85 | 2.35E+12 |
| 90 | 2.20E+12 |

Table B-2 (Continued)

| Station | B-219 |
| --- | --- |
| Trend Line: | Power |
| Equation: y=2E+13*x^(-0.9691) | |

| Existing Load (#/Day): | 6.50E+11 |
| --- | --- |
| Average (#/Day): | 6.50E+11 |

| Percent Exceedance(%) | Load(#/Day) |
| --- | --- |
| 10 | 2.15E+12 |
| 15 | 1.45E+12 |
| 20 | 1.10E+12 |
| 25 | 8.84E+11 |
| 30 | 7.41E+11 |
| 35 | 6.38E+11 |
| 40 | 5.60E+11 |
| 45 | 5.00E+11 |
| 50 | 4.51E+11 |
| 55 | 4.12E+11 |
| 60 | 3.78E+11 |
| 65 | 3.50E+11 |
| 70 | 3.26E+11 |
| 75 | 3.05E+11 |
| 80 | 2.86E+11 |
| 85 | 2.70E+11 |
| 90 | 2.55E+11 |

| Station | B-315 |
| --- | --- |
| Trend Line: | Power |
| Equation: y=7E+12*x^(-0.8033) | |

| Existing Load (#/Day): | 3.96E+11 |
| --- | --- |
| Average (#/Day): | 3.96E+11 |

| Percent Exceedance(%) | Load(#/Day) |
| --- | --- |
| 10 | 1.10E+12 |
| 15 | 7.95E+11 |
| 20 | 6.31E+11 |
| 25 | 5.27E+11 |
| 30 | 4.56E+11 |
| 35 | 4.02E+11 |
| 40 | 3.62E+11 |
| 45 | 3.29E+11 |
| 50 | 3.02E+11 |
| 55 | 2.80E+11 |
| 60 | 2.61E+11 |
| 65 | 2.45E+11 |
| 70 | 2.31E+11 |
| 75 | 2.18E+11 |
| 80 | 2.07E+11 |
| 85 | 1.97E+11 |
| 90 | 1.88E+11 |

| Station | B-332 |
| --- | --- |
| Trend Line: | Power |
| Equation: y=3E+13*x^(-0.7236) | |

| Existing Load (#/Day): | 2.23E+12 |
| --- | --- |
| Average (#/Day): | 2.23E+12 |

| Percent Exceedance(%) | Load(#/Day) |
| --- | --- |
| 10 | 5.67E+12 |
| 15 | 4.23E+12 |
| 20 | 3.43E+12 |
| 25 | 2.92E+12 |
| 30 | 2.56E+12 |
| 35 | 2.29E+12 |
| 40 | 2.08E+12 |
| 45 | 1.91E+12 |
| 50 | 1.77E+12 |
| 55 | 1.65E+12 |
| 60 | 1.55E+12 |
| 65 | 1.46E+12 |
| 70 | 1.39E+12 |
| 75 | 1.32E+12 |
| 80 | 1.26E+12 |
| 85 | 1.21E+12 |
| 90 | 1.16E+12 |

Table B-2 (Continued)

| Station | B-005 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=3E+13*x^(-0.6598)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **2.77E+12** |
| **Average (#/Day):** | **2.77E+12** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 6.57E+12 |
| 15 | 5.03E+12 |
| 20 | 4.16E+12 |
| 25 | 3.59E+12 |
| 30 | 3.18E+12 |
| 35 | 2.87E+12 |
| 40 | 2.63E+12 |
| 45 | 2.43E+12 |
| 50 | 2.27E+12 |
| 55 | 2.13E+12 |
| 60 | 2.01E+12 |
| 65 | 1.91E+12 |
| 70 | 1.82E+12 |
| 75 | 1.74E+12 |
| 80 | 1.67E+12 |
| 85 | 1.60E+12 |
| 90 | 1.54E+12 |

| Station | B-051 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=2E+14*x^(-0.7058)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **1.58E+13** |
| **Average (#/Day):** | **1.58E+13** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 3.94E+13 |
| 15 | 2.96E+13 |
| 20 | 2.41E+13 |
| 25 | 2.06E+13 |
| 30 | 1.81E+13 |
| 35 | 1.63E+13 |
| 40 | 1.48E+13 |
| 45 | 1.36E+13 |
| 50 | 1.26E+13 |
| 55 | 1.18E+13 |
| 60 | 1.11E+13 |
| 65 | 1.05E+13 |
| 70 | 9.97E+12 |
| 75 | 9.50E+12 |
| 80 | 9.07E+12 |
| 85 | 8.69E+12 |
| 90 | 8.35E+12 |

| Station | B-263 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=1E+13*x^(-0.6737)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **8.81E+11** |
| **Average (#/Day):** | **8.81E+11** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 2.12E+12 |
| 15 | 1.61E+12 |
| 20 | 1.33E+12 |
| 25 | 1.14E+12 |
| 30 | 1.01E+12 |
| 35 | 9.12E+11 |
| 40 | 8.33E+11 |
| 45 | 7.70E+11 |
| 50 | 7.17E+11 |
| 55 | 6.72E+11 |
| 60 | 6.34E+11 |
| 65 | 6.01E+11 |
| 70 | 5.71E+11 |
| 75 | 5.45E+11 |
| 80 | 5.22E+11 |
| 85 | 5.01E+11 |
| 90 | 4.82E+11 |

Table B-2 (Continued)

| Station | B-019 |
|---|---|
| Trend Line: | Power |
| Equation: y=2E+13*x^(-1.289) | |

| Existing Load (#/Day): | 2.32E+11 |
|---|---|
| Average (#/Day): | 2.32E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.03E+12 |
| 15 | 6.10E+11 |
| 20 | 4.21E+11 |
| 25 | 3.16E+11 |
| 30 | 2.49E+11 |
| 35 | 2.05E+11 |
| 40 | 1.72E+11 |
| 45 | 1.48E+11 |
| 50 | 1.29E+11 |
| 55 | 1.14E+11 |
| 60 | 1.02E+11 |
| 65 | 9.21E+10 |
| 70 | 8.37E+10 |
| 75 | 7.66E+10 |
| 80 | 7.05E+10 |
| 85 | 6.52E+10 |
| 90 | 6.05E+10 |

| Station | B-020 |
|---|---|
| Trend Line: | Power |
| Equation: y=4E+14*x^(-1.2597) | |

| Existing Load (#/Day): | 5.09E+12 |
|---|---|
| Average (#/Day): | 5.09E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 2.20E+13 |
| 15 | 1.32E+13 |
| 20 | 9.19E+12 |
| 25 | 6.94E+12 |
| 30 | 5.51E+12 |
| 35 | 4.54E+12 |
| 40 | 3.84E+12 |
| 45 | 3.31E+12 |
| 50 | 2.90E+12 |
| 55 | 2.57E+12 |
| 60 | 2.30E+12 |
| 65 | 2.08E+12 |
| 70 | 1.90E+12 |
| 75 | 1.74E+12 |
| 80 | 1.60E+12 |
| 85 | 1.48E+12 |
| 90 | 1.38E+12 |

| Station | B-021 |
|---|---|
| Trend Line: | Power |
| Equation: y=6E+13*x^(-0.9484) | |

| Existing Load (#/Day): | 2.09E+12 |
|---|---|
| Average (#/Day): | 2.09E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 6.76E+12 |
| 15 | 4.60E+12 |
| 20 | 3.50E+12 |
| 25 | 2.83E+12 |
| 30 | 2.38E+12 |
| 35 | 2.06E+12 |
| 40 | 1.81E+12 |
| 45 | 1.62E+12 |
| 50 | 1.47E+12 |
| 55 | 1.34E+12 |
| 60 | 1.24E+12 |
| 65 | 1.14E+12 |
| 70 | 1.07E+12 |
| 75 | 1.00E+12 |
| 80 | 9.40E+11 |
| 85 | 8.88E+11 |
| 90 | 8.41E+11 |

Table B-2 (Continued)

| Station | B-067A |
|---|---|
| Trend Line: | Power |
| Equation: y=2E+13*x^(-1.2079) | |

| Existing Load (#/Day): | 3.00E+11 |
|---|---|
| Average (#/Day): | 3.00E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.24E+12 |
| 15 | 7.59E+11 |
| 20 | 5.36E+11 |
| 25 | 4.10E+11 |
| 30 | 3.29E+11 |
| 35 | 2.73E+11 |
| 40 | 2.32E+11 |
| 45 | 2.01E+11 |
| 50 | 1.77E+11 |
| 55 | 1.58E+11 |
| 60 | 1.42E+11 |
| 65 | 1.29E+11 |
| 70 | 1.18E+11 |
| 75 | 1.09E+11 |
| 80 | 1.01E+11 |
| 85 | 9.34E+10 |
| 90 | 8.72E+10 |

| Station | B-067B |
|---|---|
| Trend Line: | Power |
| Equation: y=8E+12*x^(-1.0277) | |

| Existing Load (#/Day): | 2.14E+11 |
|---|---|
| Average (#/Day): | 2.14E+11 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 7.51E+11 |
| 15 | 4.95E+11 |
| 20 | 3.68E+11 |
| 25 | 2.93E+11 |
| 30 | 2.43E+11 |
| 35 | 2.07E+11 |
| 40 | 1.81E+11 |
| 45 | 1.60E+11 |
| 50 | 1.44E+11 |
| 55 | 1.30E+11 |
| 60 | 1.19E+11 |
| 65 | 1.10E+11 |
| 70 | 1.02E+11 |
| 75 | 9.46E+10 |
| 80 | 8.86E+10 |
| 85 | 8.32E+10 |
| 90 | 7.85E+10 |

| Station | B-164 |
|---|---|
| Trend Line: | Power |
| Equation: y=1E+14*x^(-1.2274) | |

| Existing Load (#/Day): | 1.41E+12 |
|---|---|
| Average (#/Day): | 1.41E+12 |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 5.92E+12 |
| 15 | 3.60E+12 |
| 20 | 2.53E+12 |
| 25 | 1.92E+12 |
| 30 | 1.54E+12 |
| 35 | 1.27E+12 |
| 40 | 1.08E+12 |
| 45 | 9.35E+11 |
| 50 | 8.22E+11 |
| 55 | 7.31E+11 |
| 60 | 6.57E+11 |
| 65 | 5.95E+11 |
| 70 | 5.44E+11 |
| 75 | 5.00E+11 |
| 80 | 4.61E+11 |
| 85 | 4.28E+11 |
| 90 | 3.99E+11 |

Table B-2 (Continued)

| Station | B-235 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=5E+12*x^(-1.0315)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **1.32E+11** |
| **Average (#/Day):** | **1.32E+11** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 4.65E+11 |
| 15 | 3.06E+11 |
| 20 | 2.27E+11 |
| 25 | 1.81E+11 |
| 30 | 1.50E+11 |
| 35 | 1.28E+11 |
| 40 | 1.11E+11 |
| 45 | 9.86E+10 |
| 50 | 8.84E+10 |
| 55 | 8.01E+10 |
| 60 | 7.32E+10 |
| 65 | 6.74E+10 |
| 70 | 6.25E+10 |
| 75 | 5.82E+10 |
| 80 | 5.44E+10 |
| 85 | 5.11E+10 |
| 90 | 4.82E+10 |

| Station | B-286 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=8E+12*x^(-1.311)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **8.66E+10** |
| **Average (#/Day):** | **8.66E+10** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 3.91E+11 |
| 15 | 2.30E+11 |
| 20 | 1.58E+11 |
| 25 | 1.18E+11 |
| 30 | 9.26E+10 |
| 35 | 7.57E+10 |
| 40 | 6.35E+10 |
| 45 | 5.44E+10 |
| 50 | 4.74E+10 |
| 55 | 4.18E+10 |
| 60 | 3.73E+10 |
| 65 | 3.36E+10 |
| 70 | 3.05E+10 |
| 75 | 2.79E+10 |
| 80 | 2.56E+10 |
| 85 | 2.36E+10 |
| 90 | 2.19E+10 |

| Station | B-287 |
|---|---|
| **Trend Line:** | **Power** |
| **Equation: y=1E+12*x^(-0.7777)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **6.17E+10** |
| **Average (#/Day):** | **6.17E+10** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 1.67E+11 |
| 15 | 1.22E+11 |
| 20 | 9.73E+10 |
| 25 | 8.18E+10 |
| 30 | 7.10E+10 |
| 35 | 6.30E+10 |
| 40 | 5.68E+10 |
| 45 | 5.18E+10 |
| 50 | 4.77E+10 |
| 55 | 4.43E+10 |
| 60 | 4.14E+10 |
| 65 | 3.89E+10 |
| 70 | 3.67E+10 |
| 75 | 3.48E+10 |
| 80 | 3.31E+10 |
| 85 | 3.16E+10 |
| 90 | 3.02E+10 |

Table B-2 (Continued)

| | |
|---|---|
| **Station** | **B-321** |
| **Trend Line:** | **Power** |
| **Equation: y=2E+11*x^(-0.6078)** | |

| | |
|---|---|
| **Existing Load (#/Day):** | **2.21E+10** |
| **Average (#/Day):** | **2.21E+10** |

| Percent Exceedance(%) | Load(#/Day) |
|---|---|
| 10 | 4.93E+10 |
| 15 | 3.86E+10 |
| 20 | 3.24E+10 |
| 25 | 2.83E+10 |
| 30 | 2.53E+10 |
| 35 | 2.30E+10 |
| 40 | 2.12E+10 |
| 45 | 1.98E+10 |
| 50 | 1.86E+10 |
| 55 | 1.75E+10 |
| 60 | 1.66E+10 |
| 65 | 1.58E+10 |
| 70 | 1.51E+10 |
| 75 | 1.45E+10 |
| 80 | 1.39E+10 |
| 85 | 1.34E+10 |
| 90 | 1.30E+10 |

Figure B-1 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-317

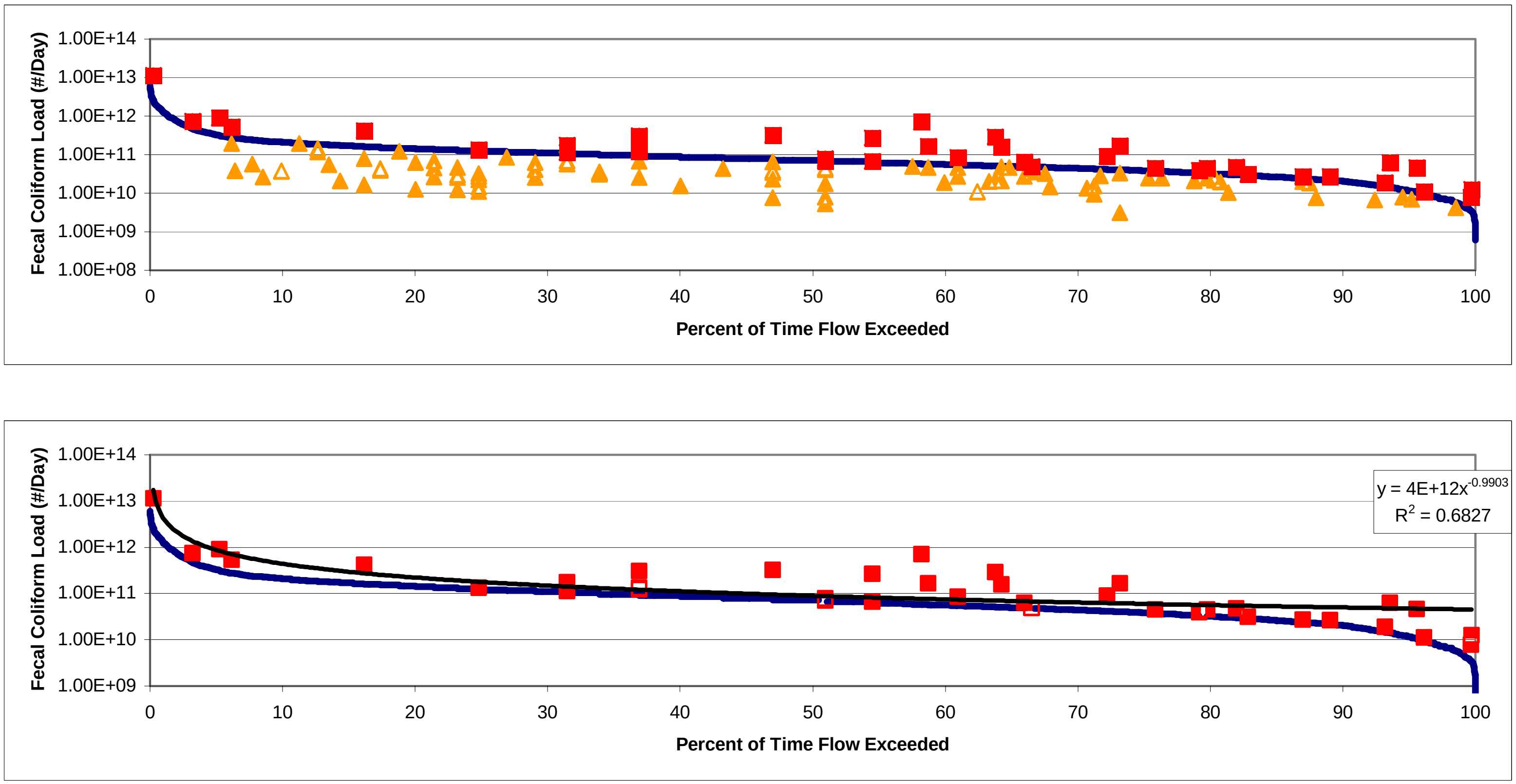
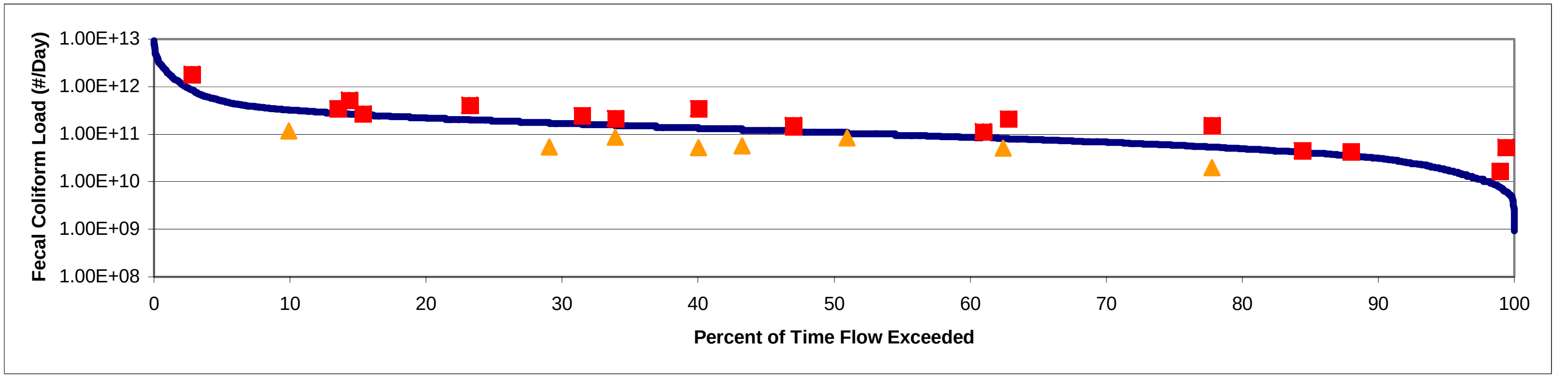


Figure B-2 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-336



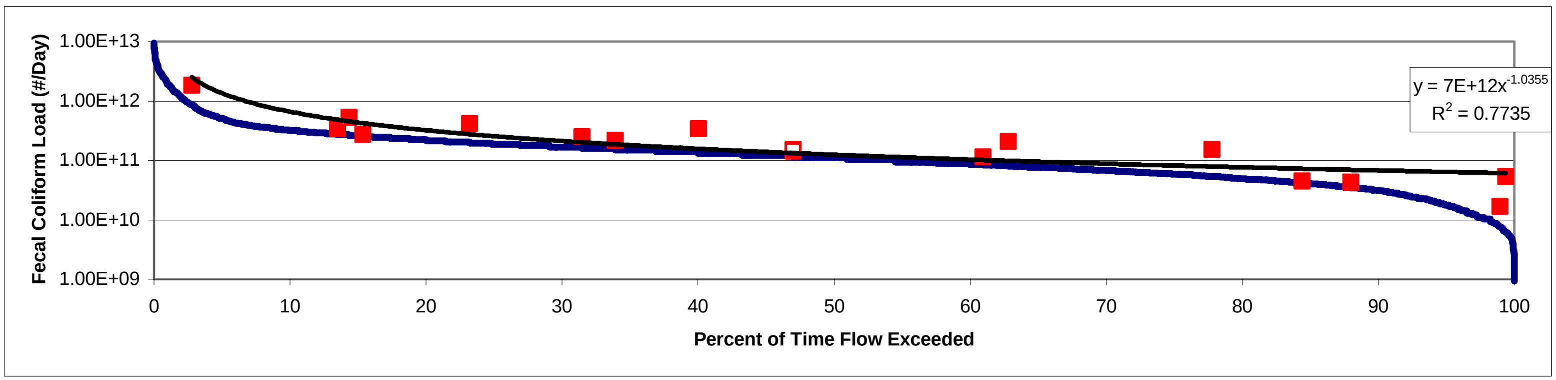
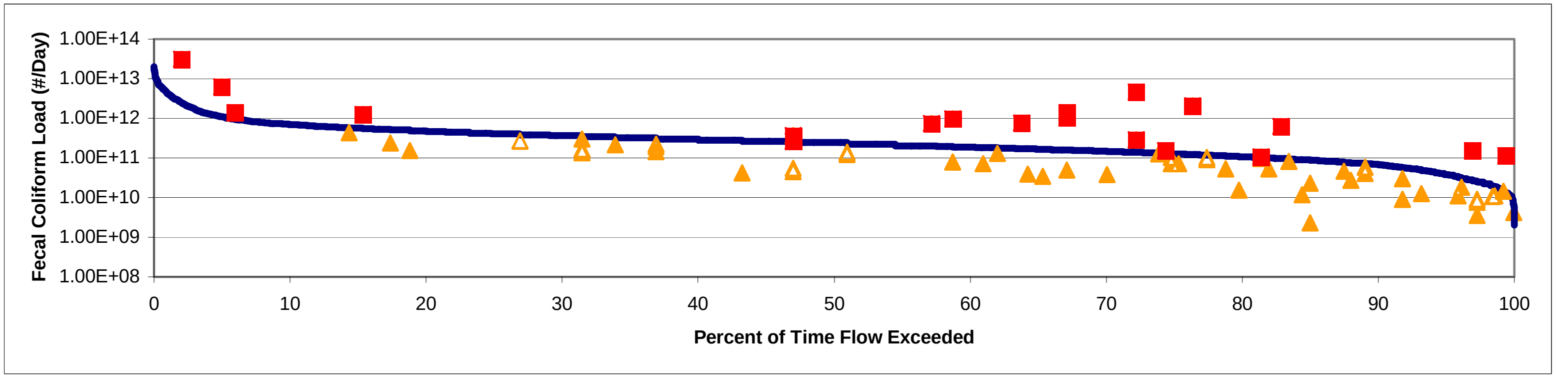



Figure B-3 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at BF-007



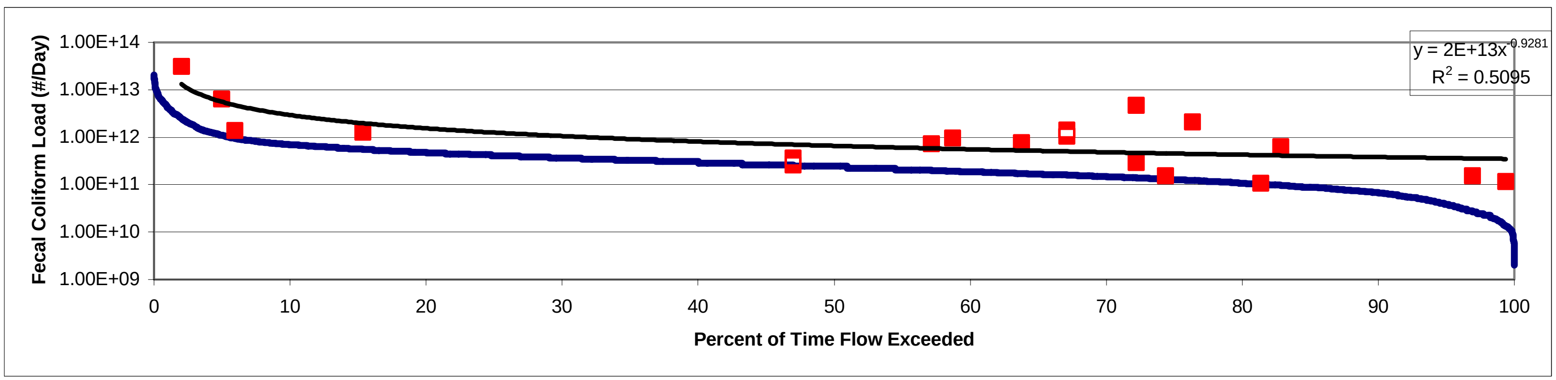
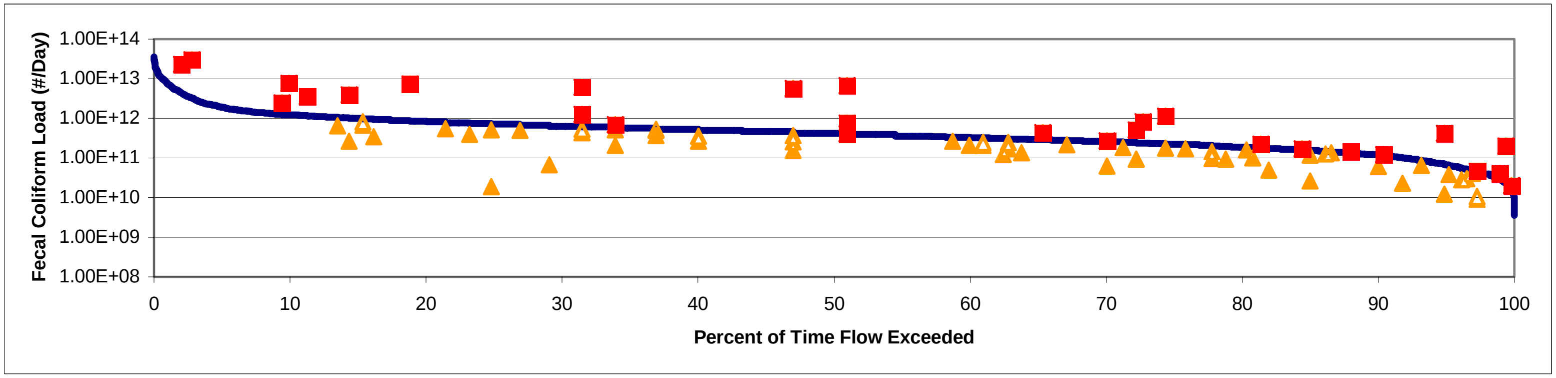



Figure B-4 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at BF-008



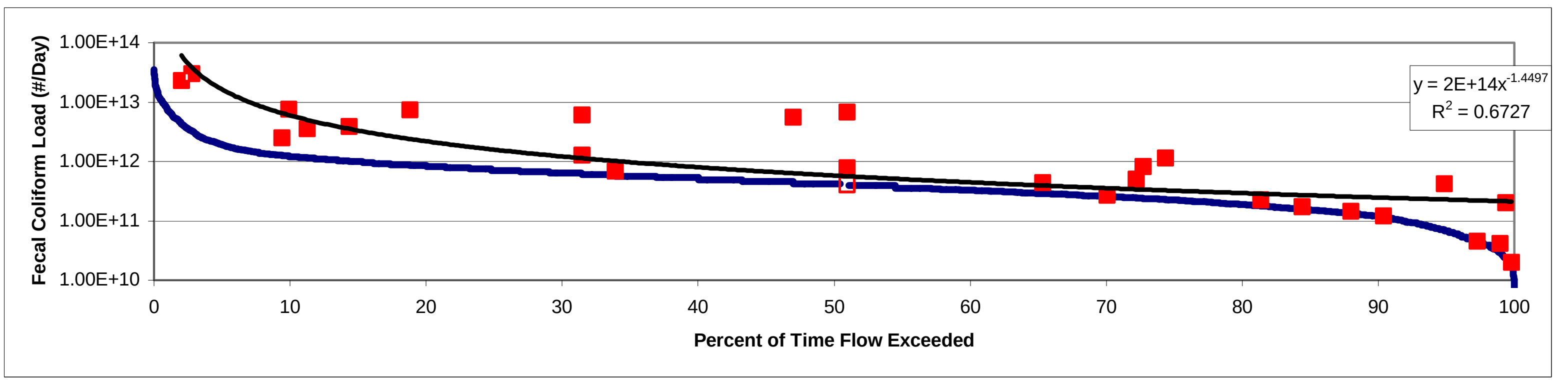
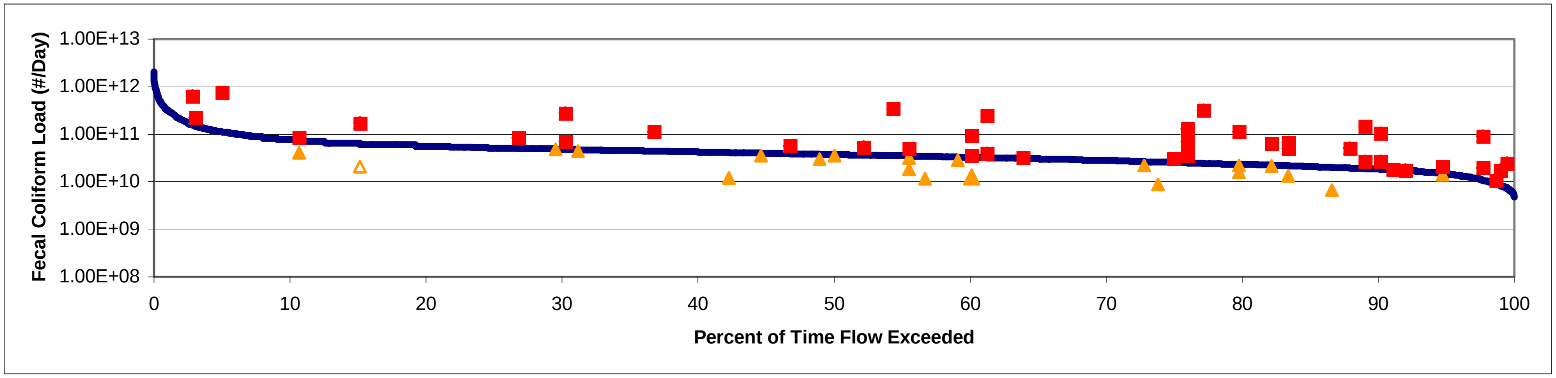



Figure B-5 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-199



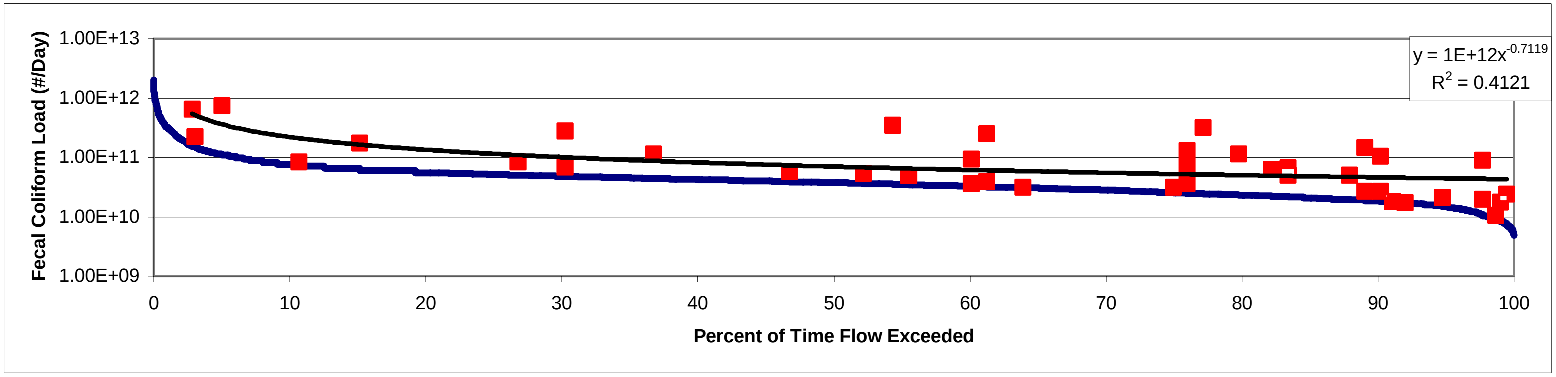
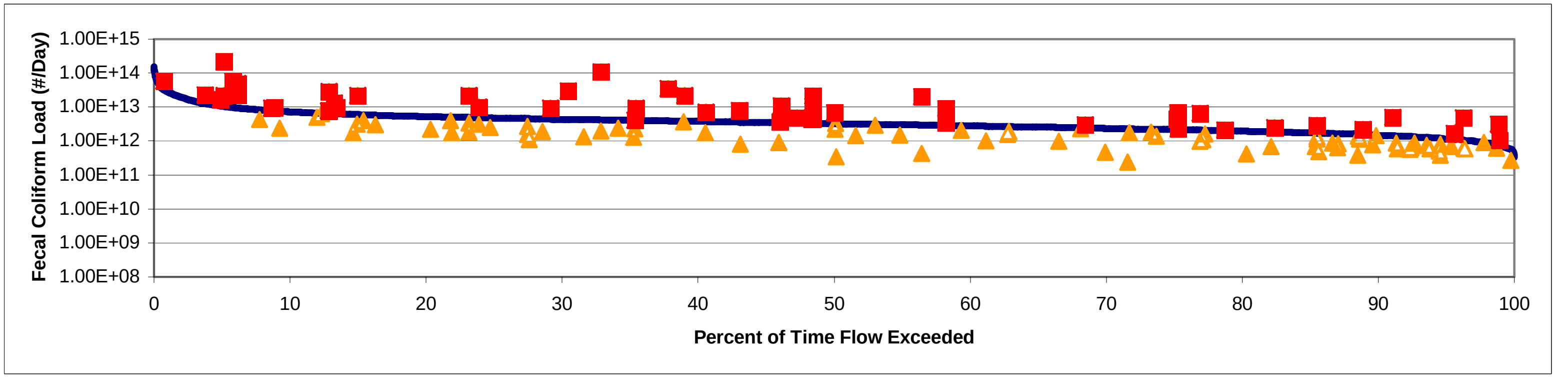



Figure B-6 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-008



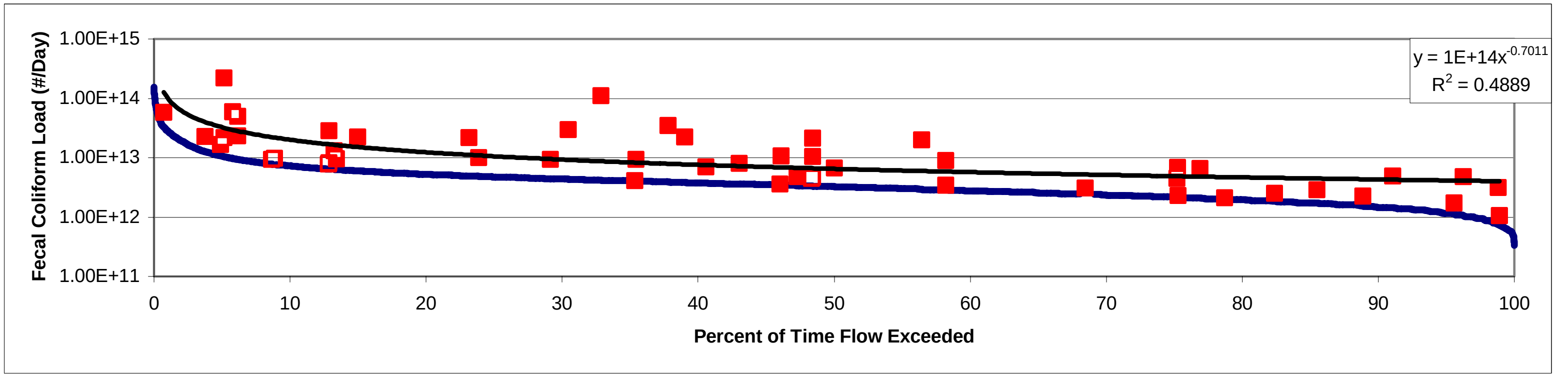
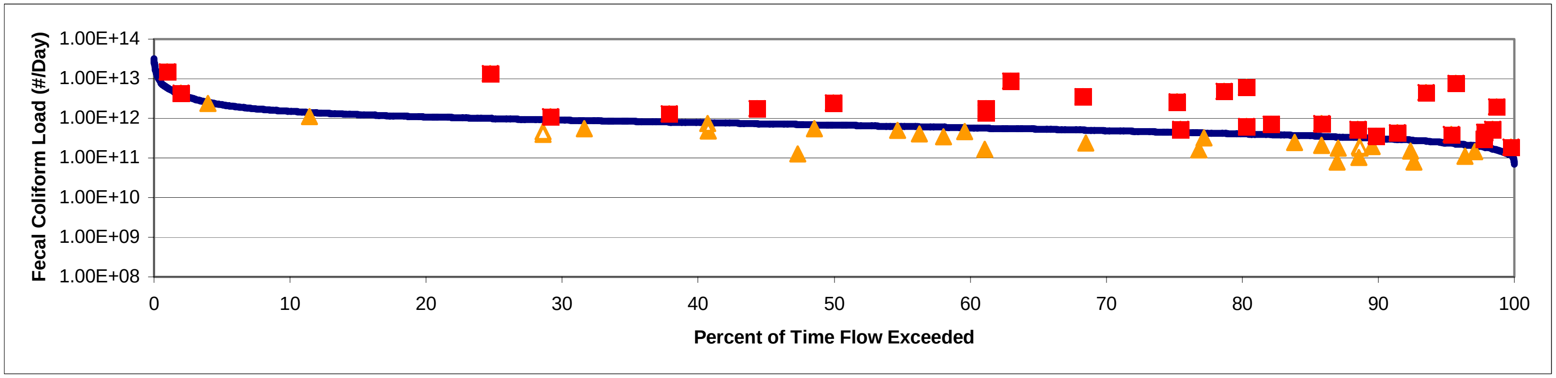



Figure B-7 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-012



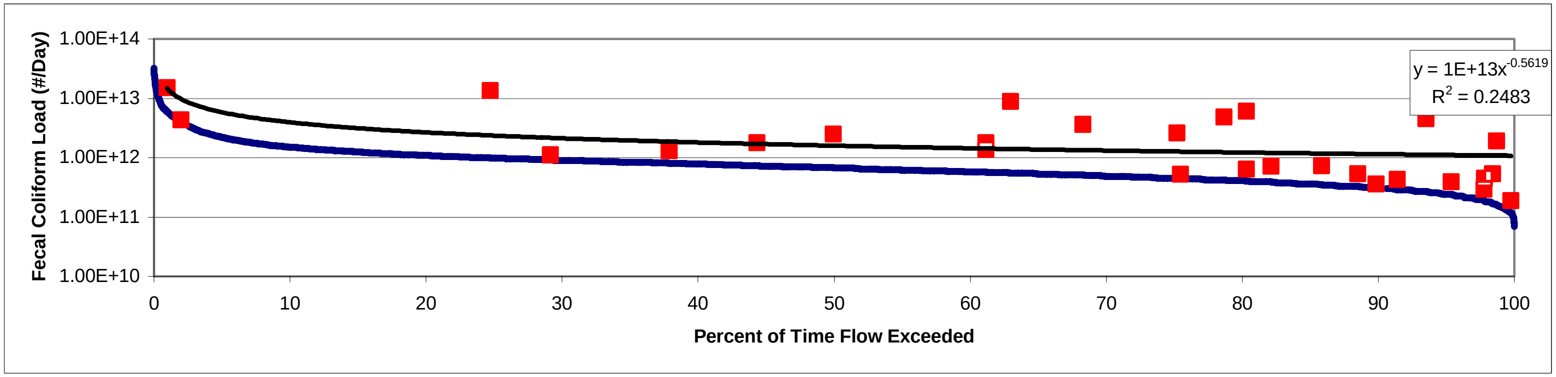
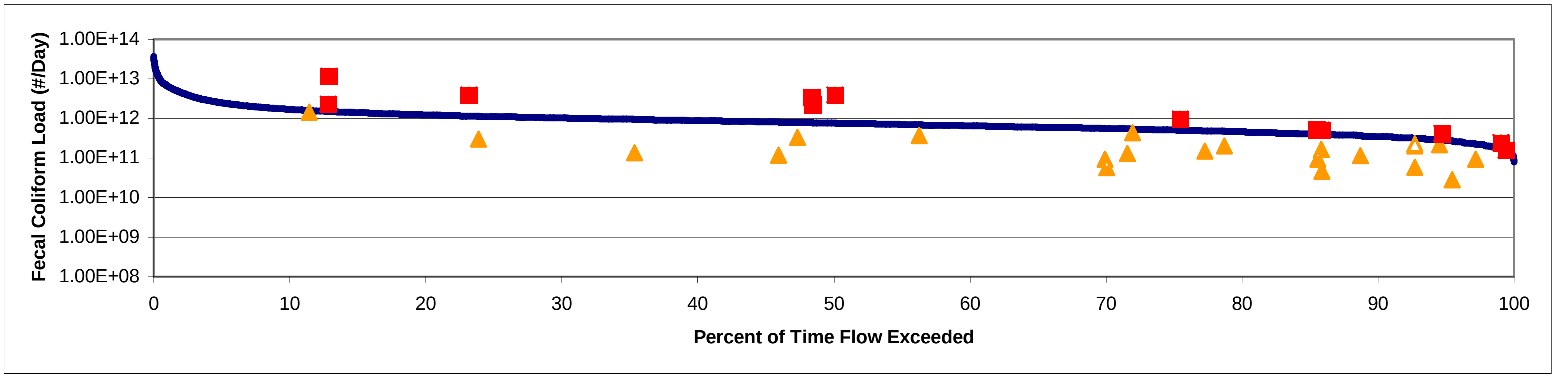



Figure B-8 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-014



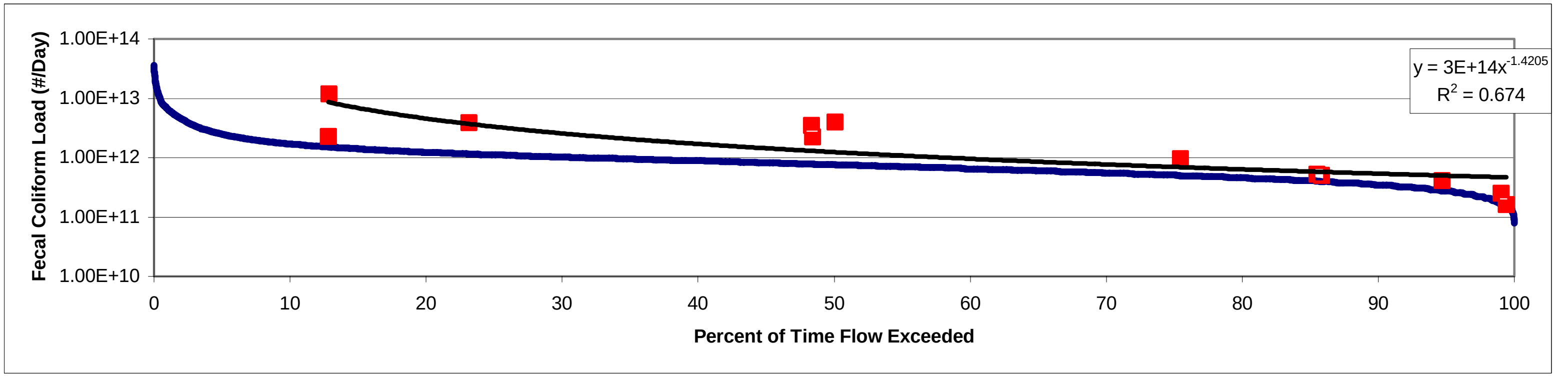
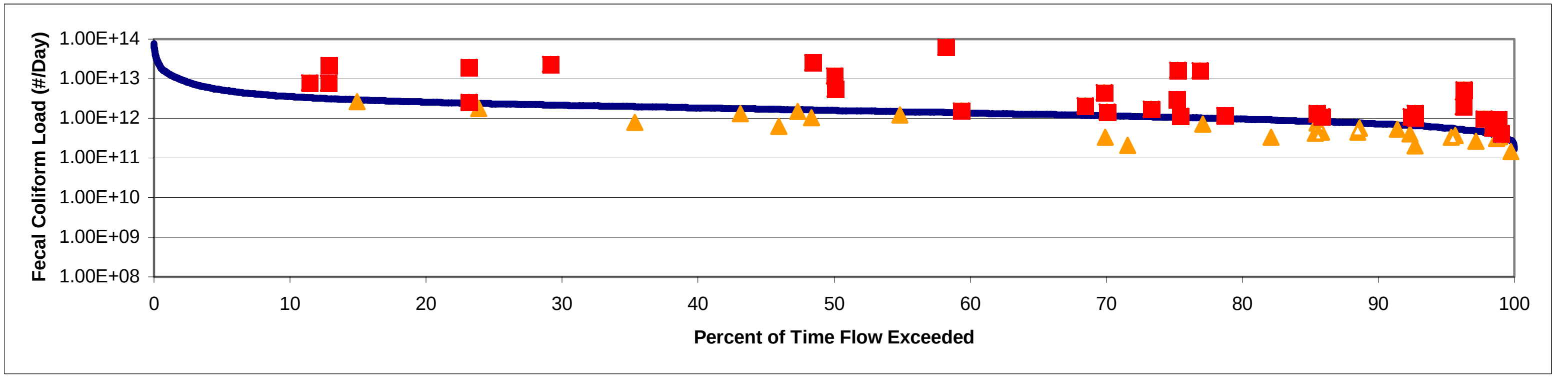



Figure B-9 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-018A



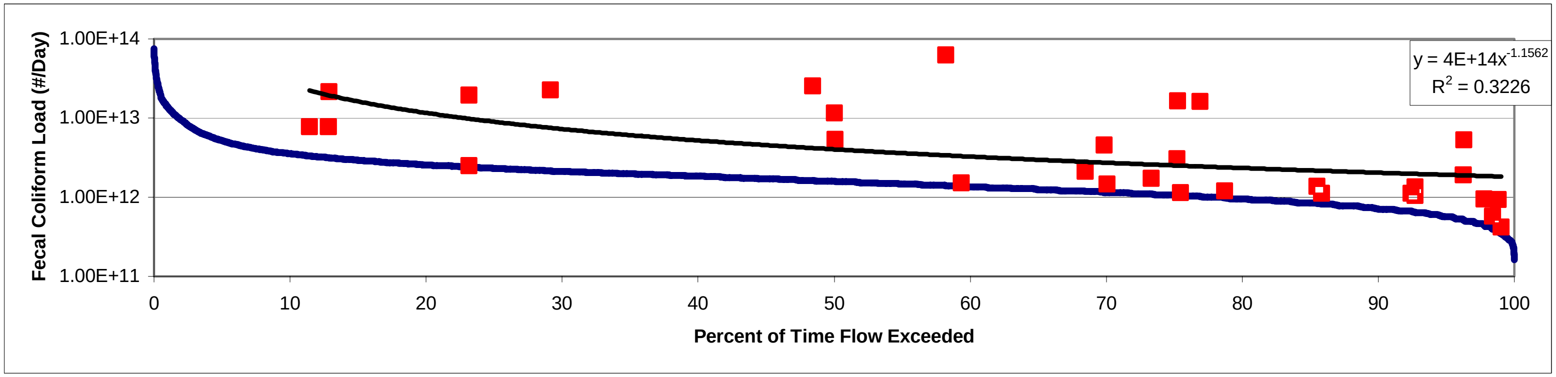
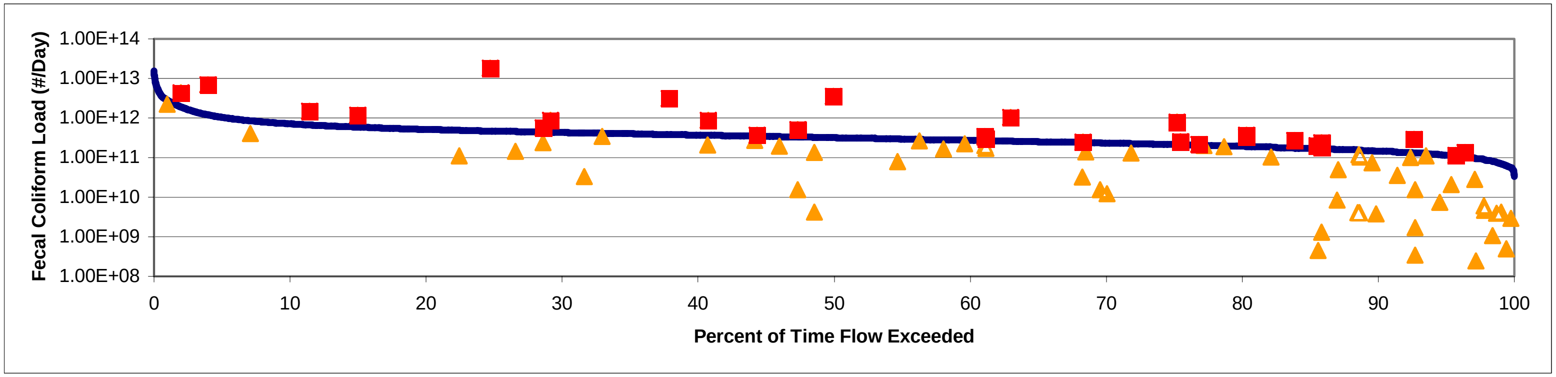



Figure B-10 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-219



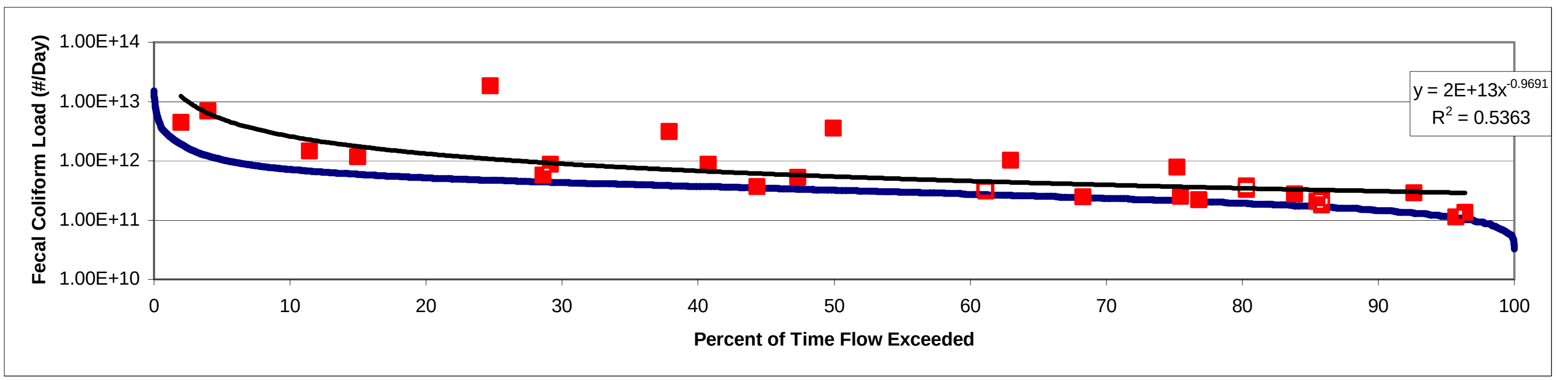
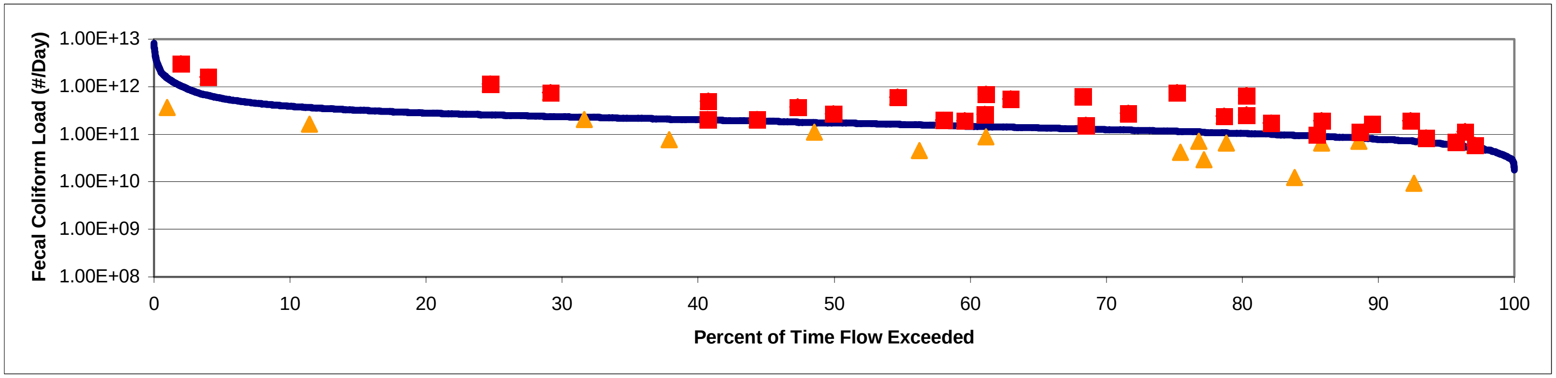



Figure B-11 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-315



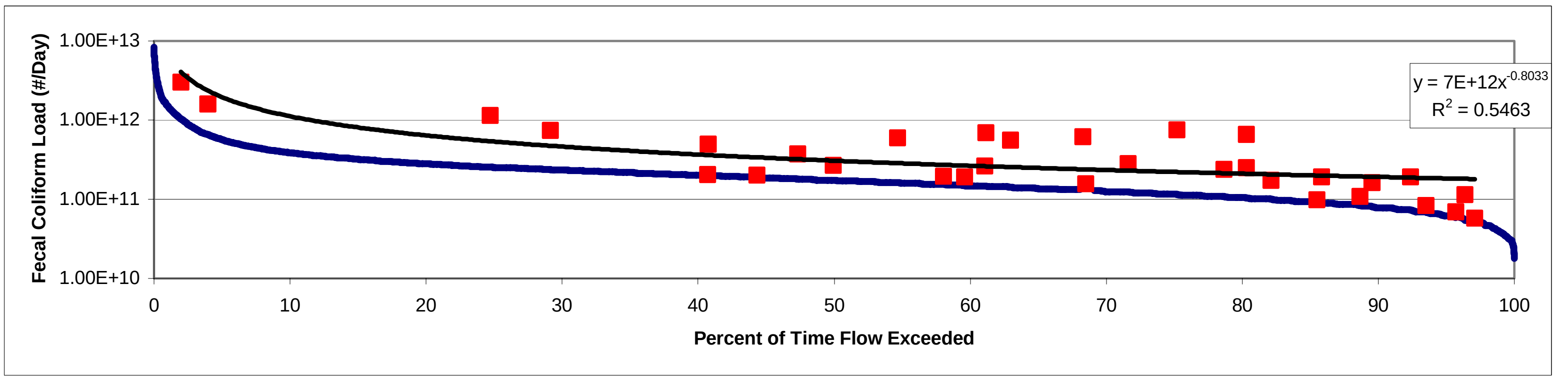
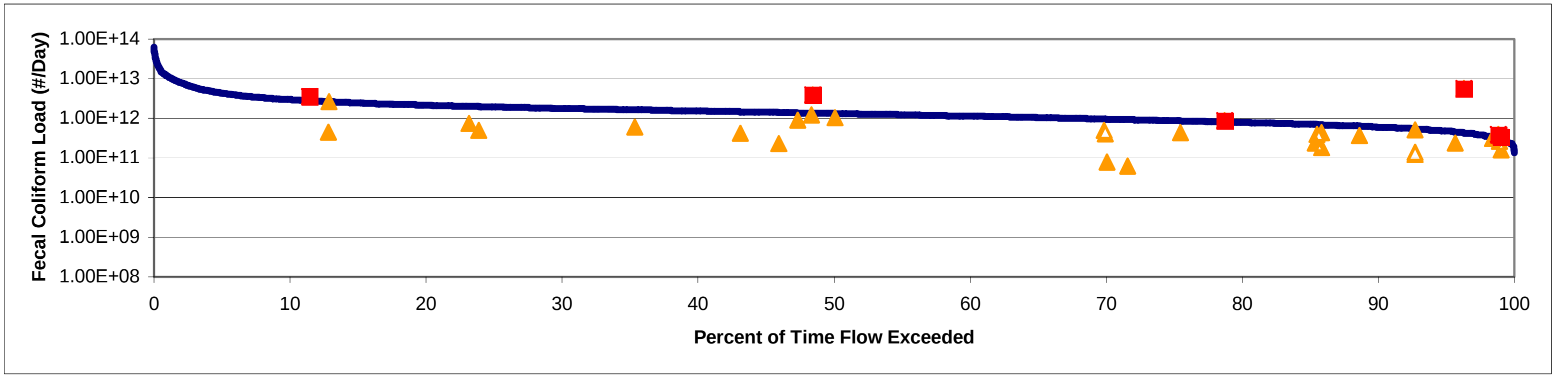



Figure B-12 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-332



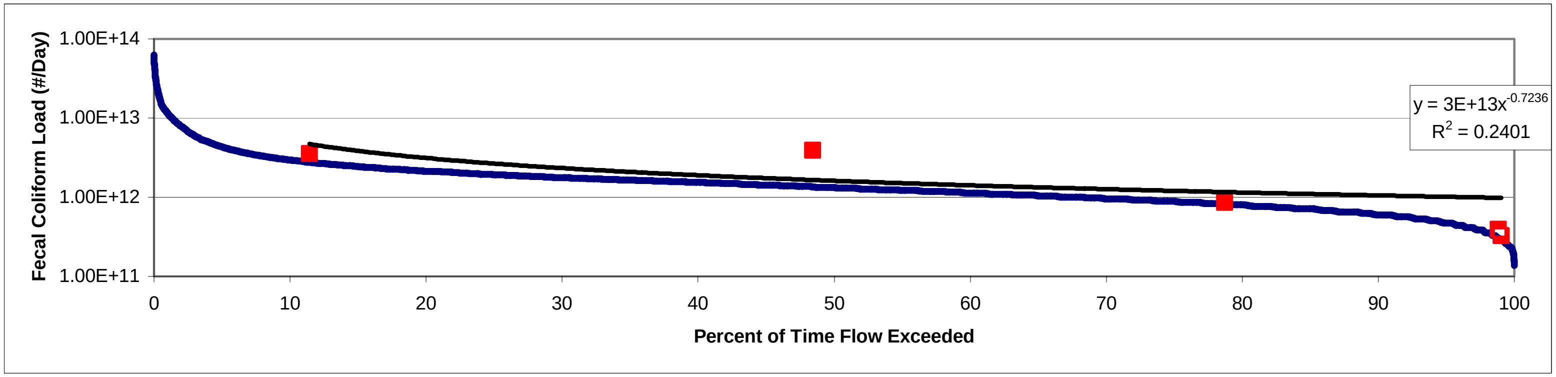
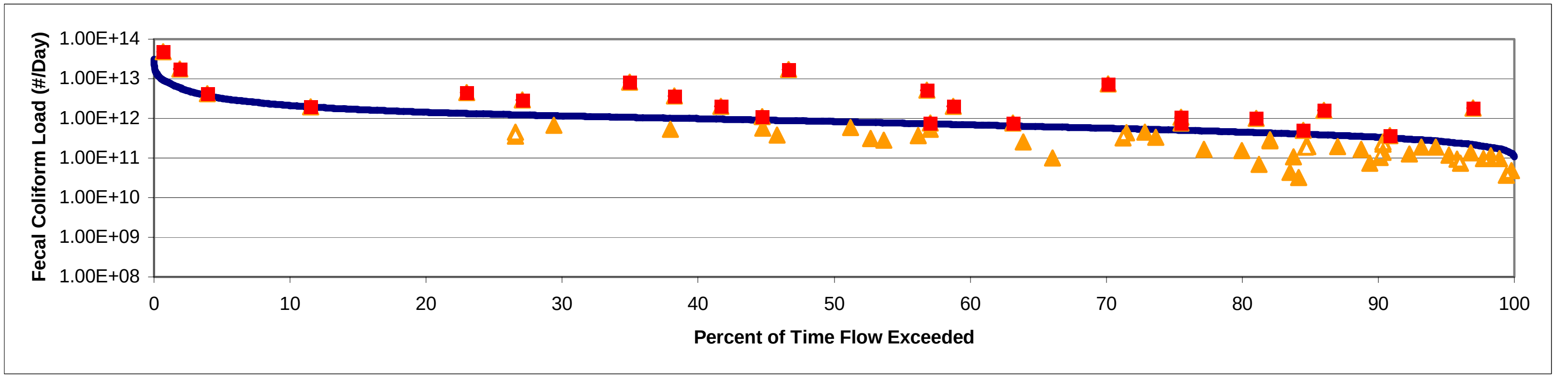



Figure B-13  Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-005



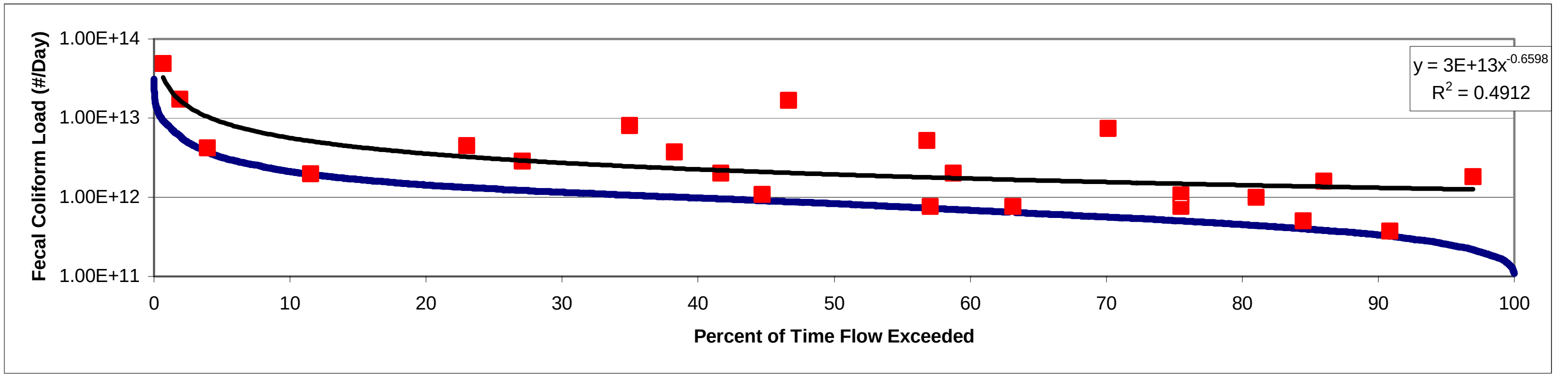
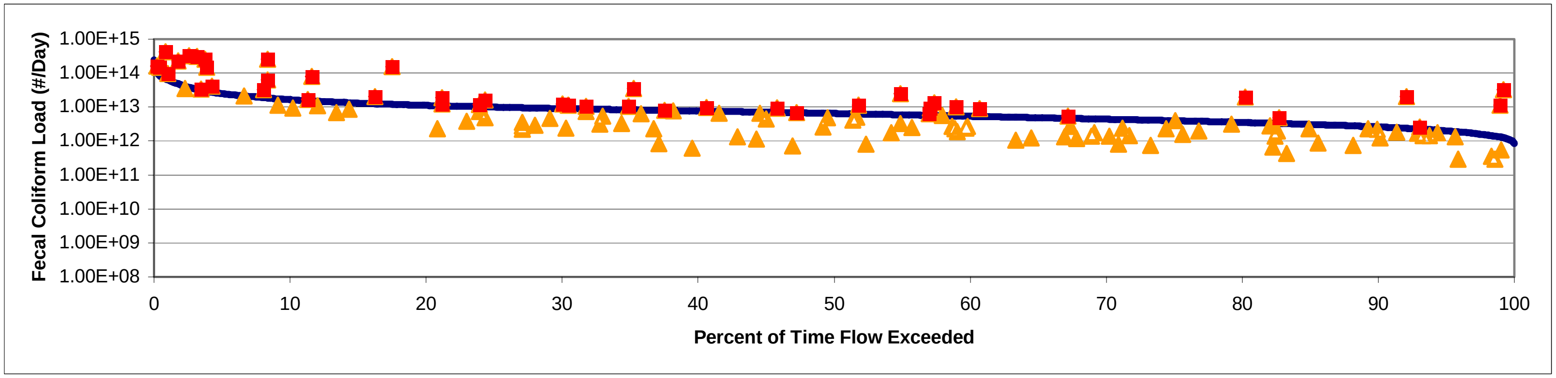



Figure B-14 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-051



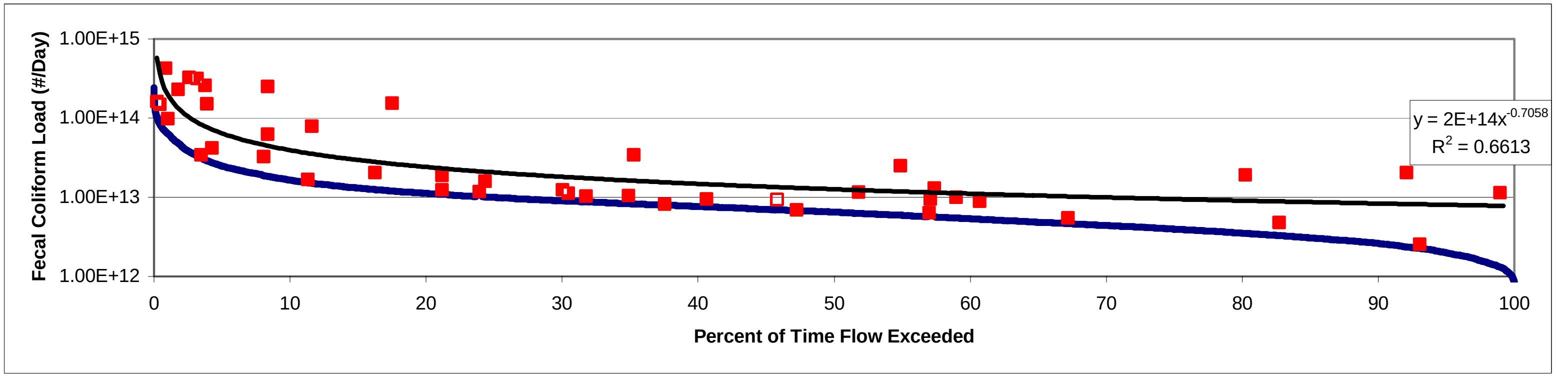
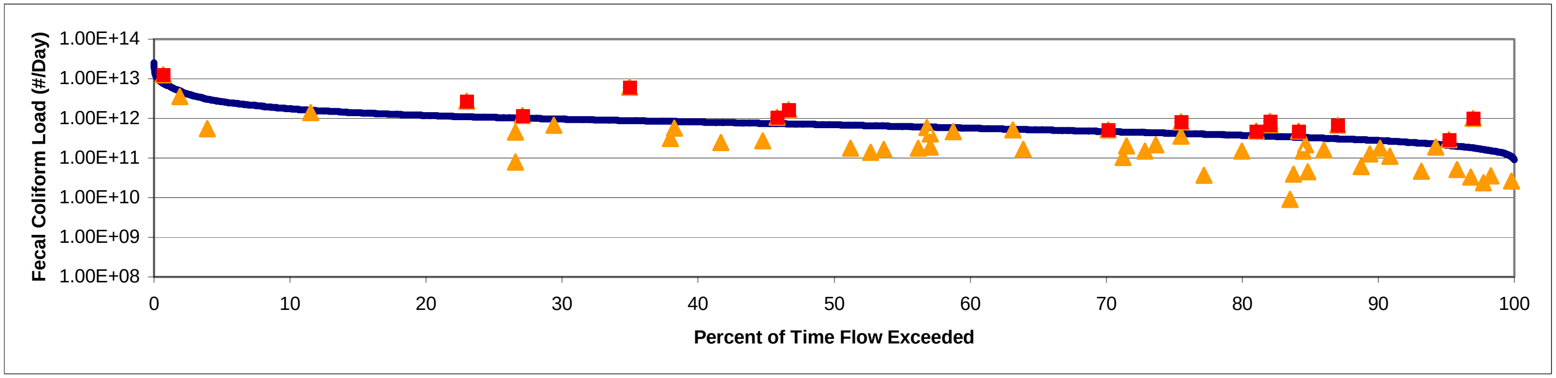



Figure B-15 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-263



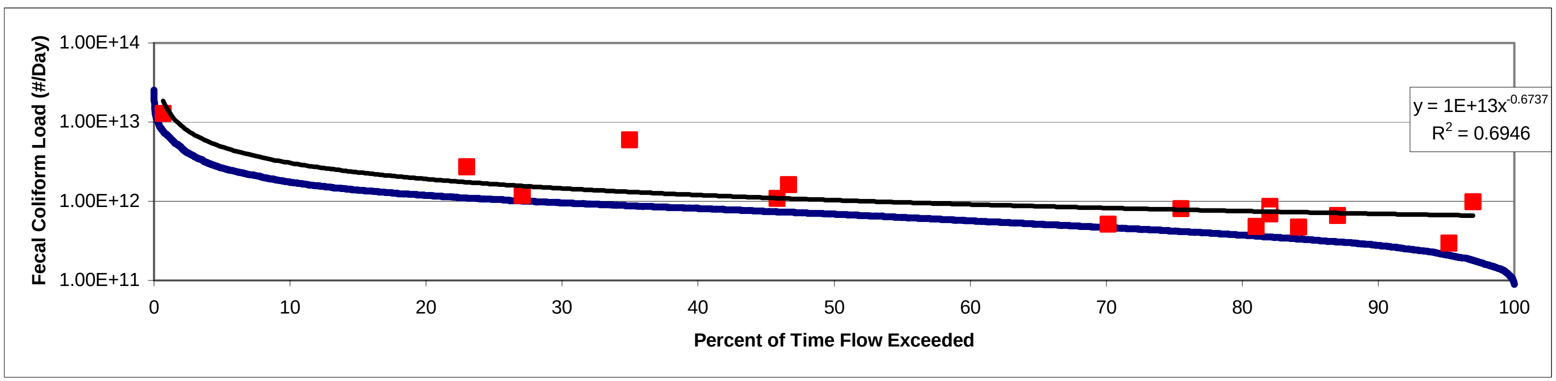
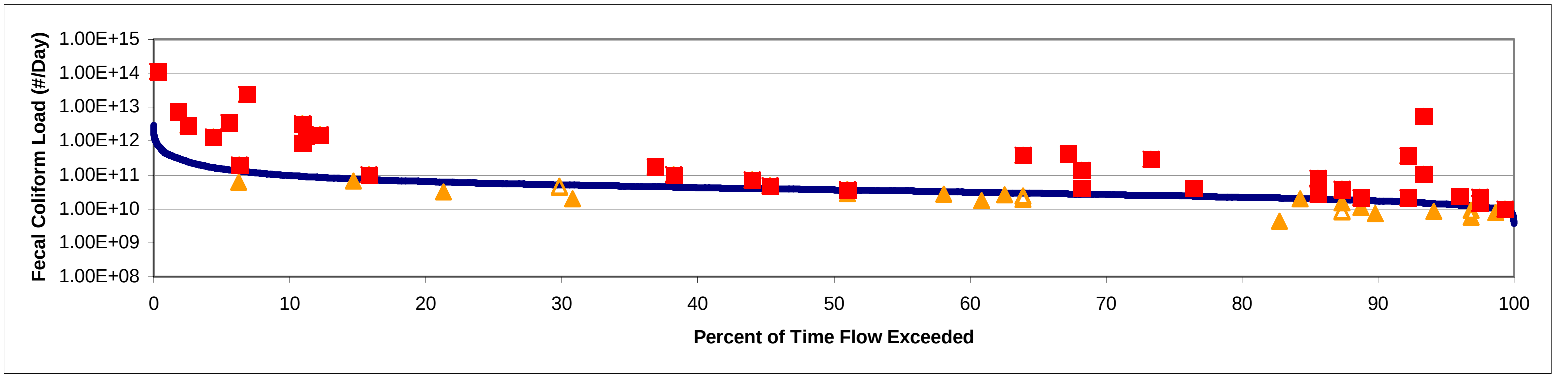



Figure B-16 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-019



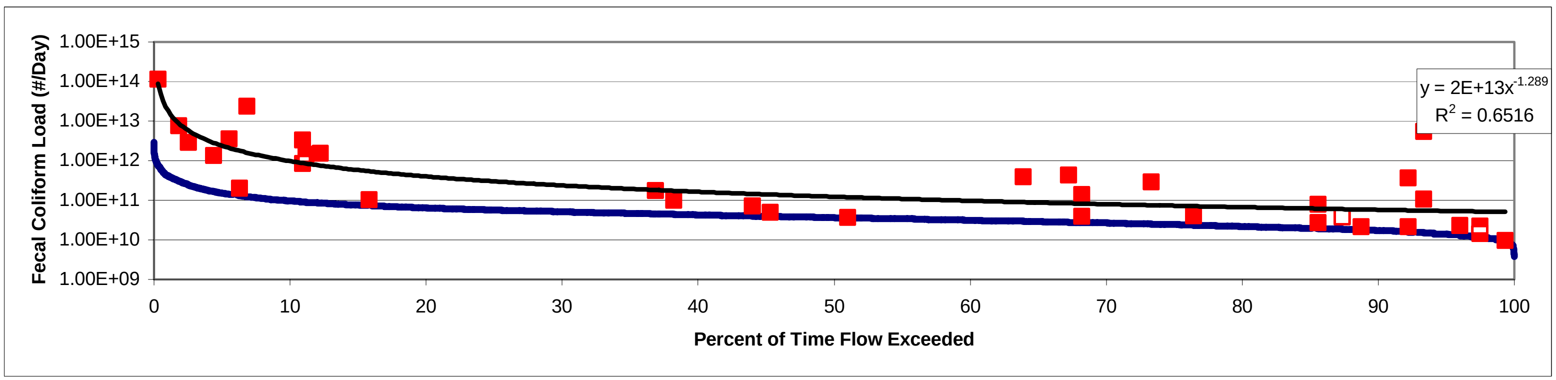
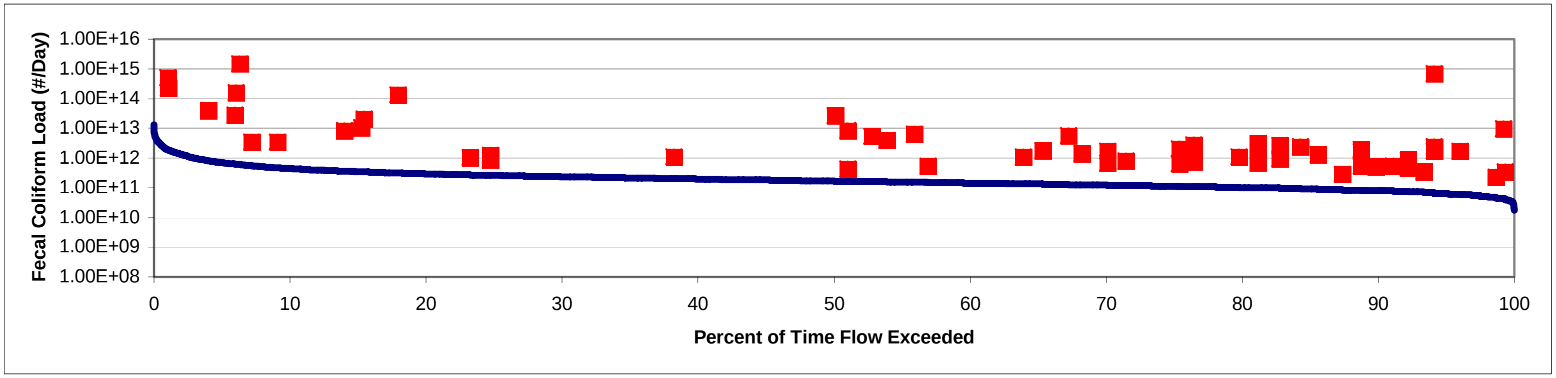



Figure B-17 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-020



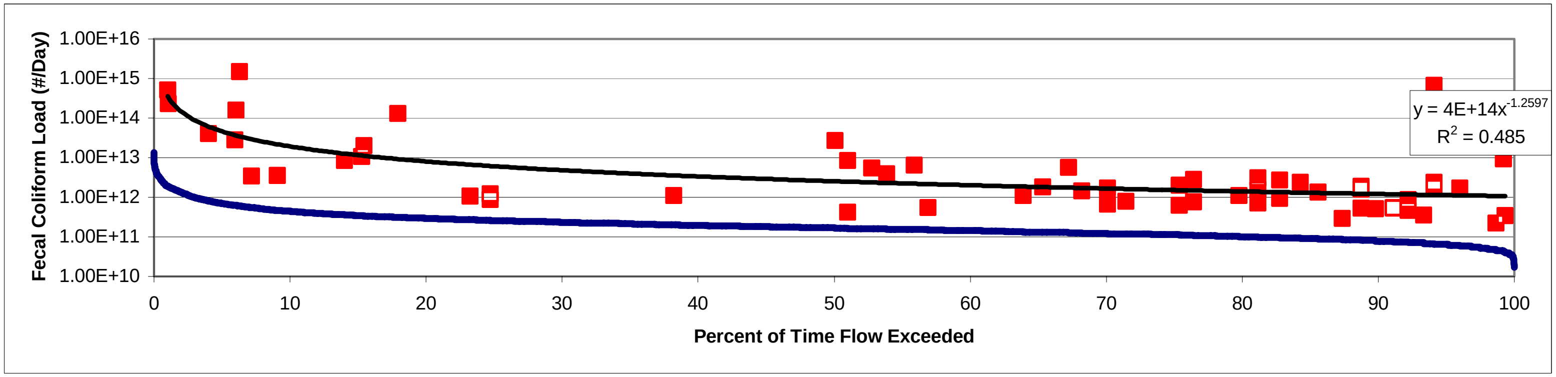
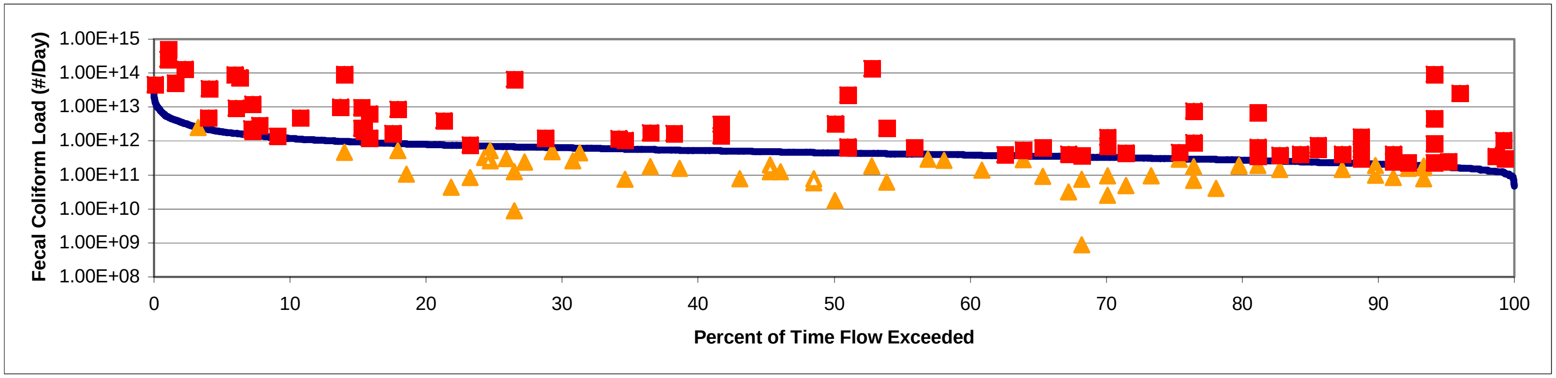



Figure B-18 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-021



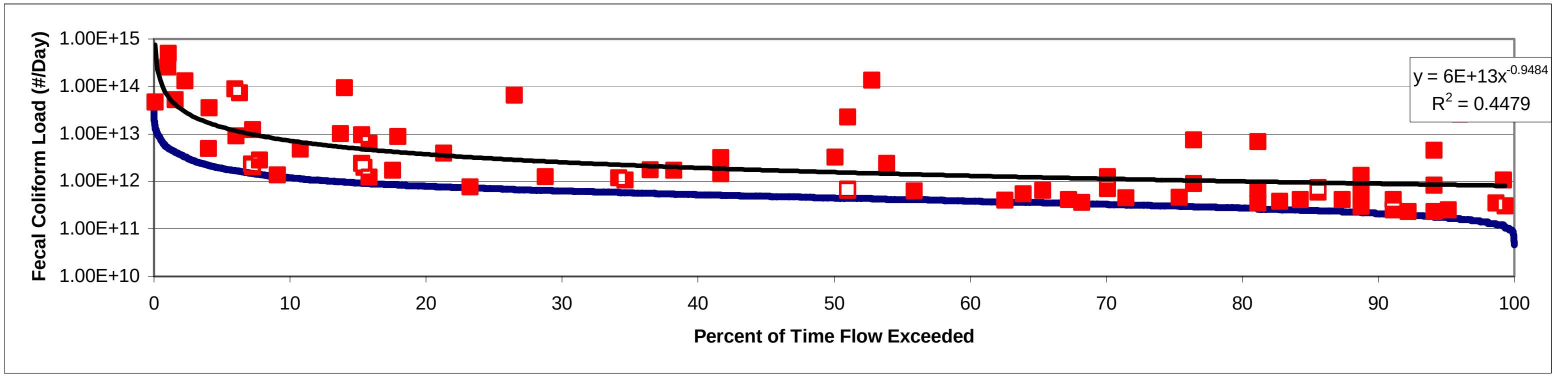
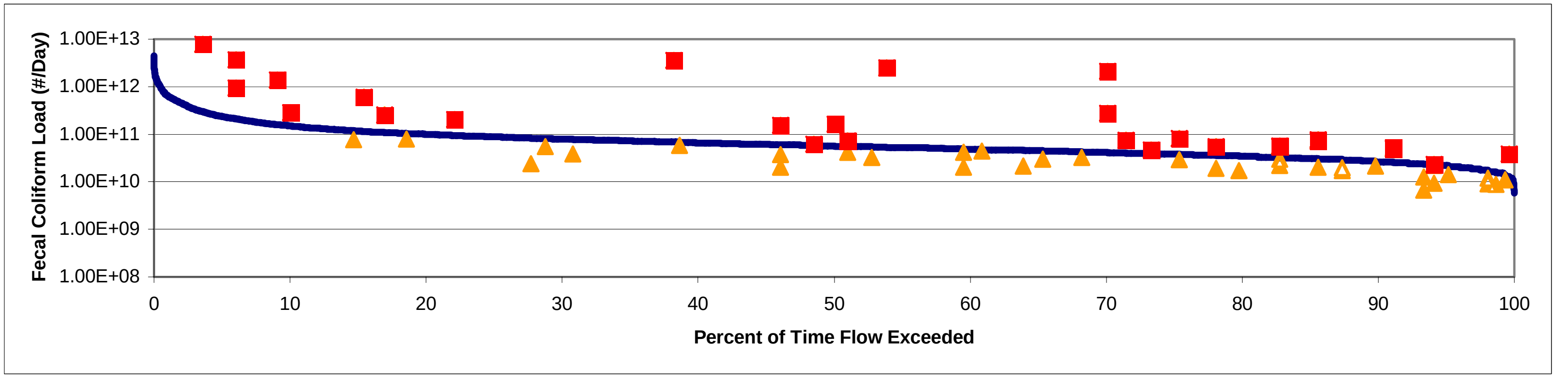



Figure B-19 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-067A



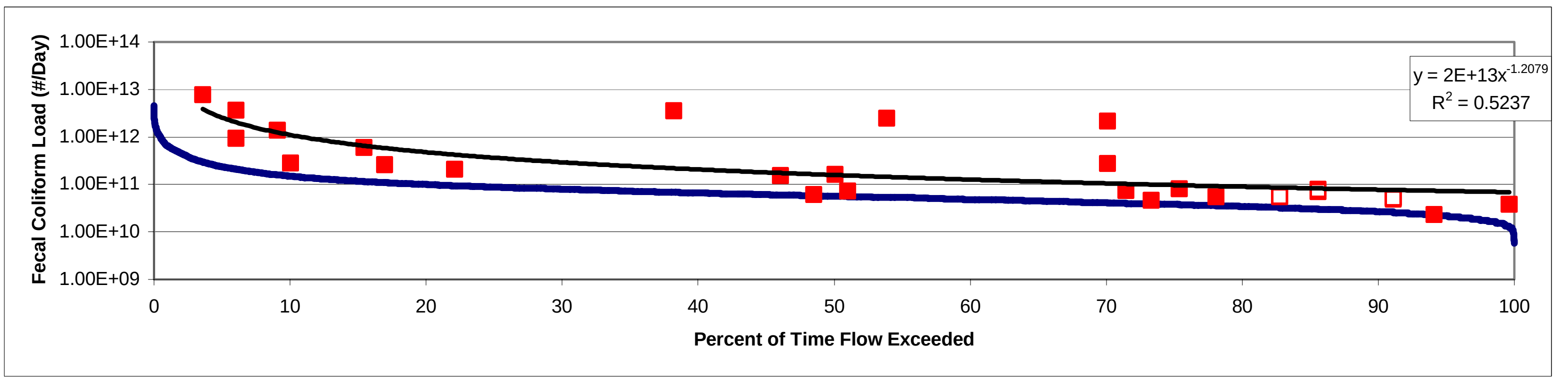
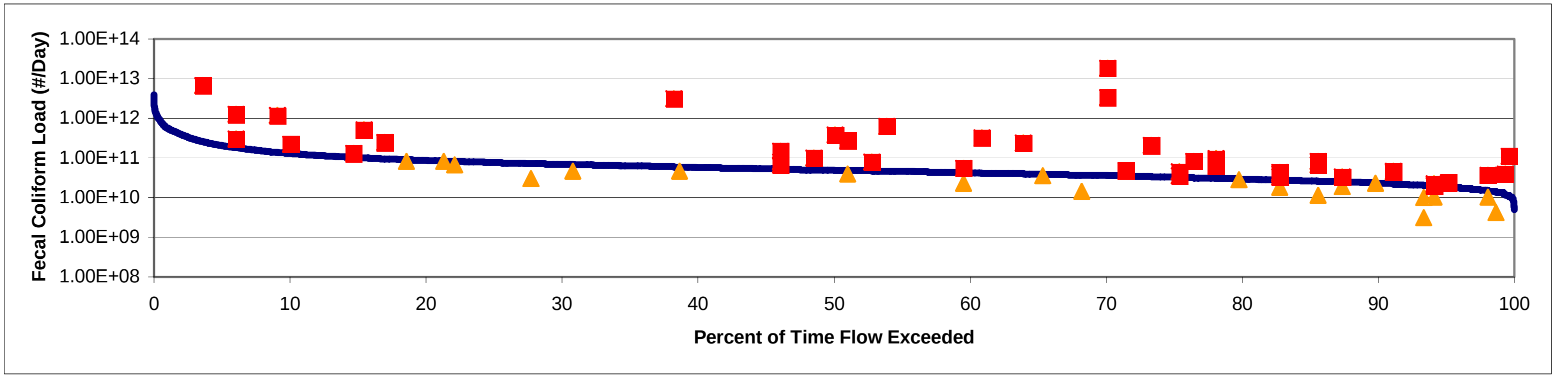



Figure B-20 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-067B



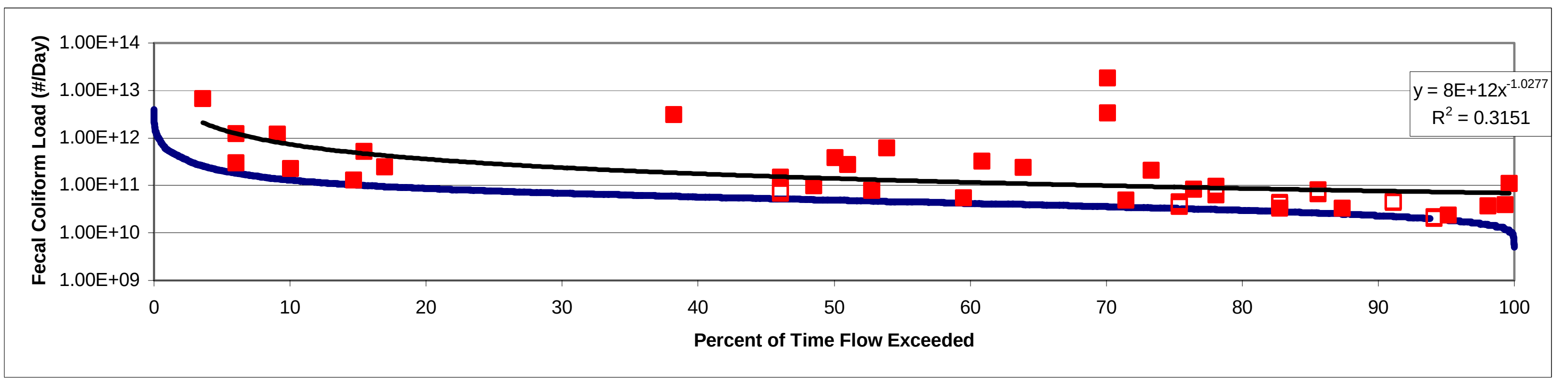
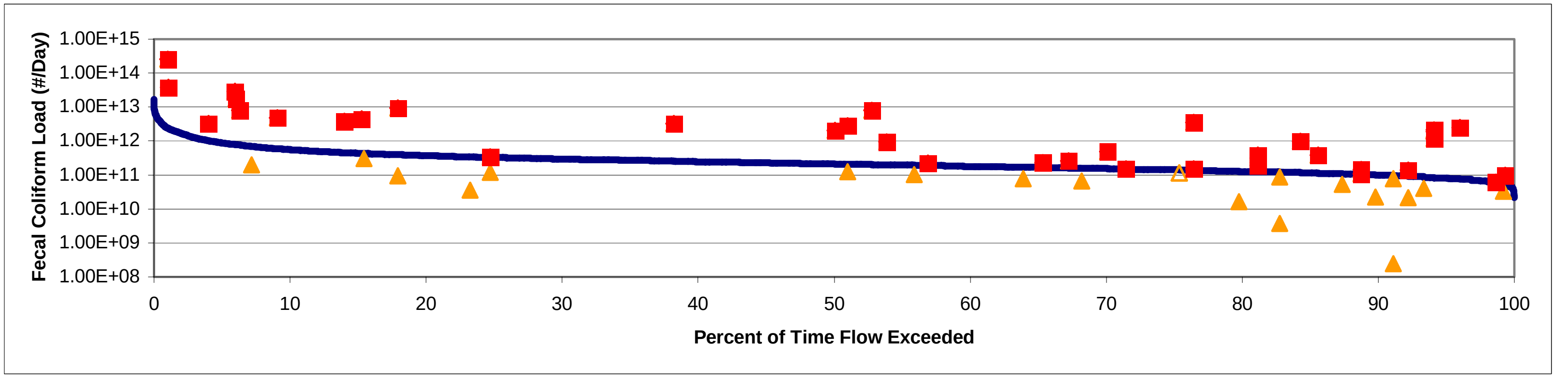



Figure B-21 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-164



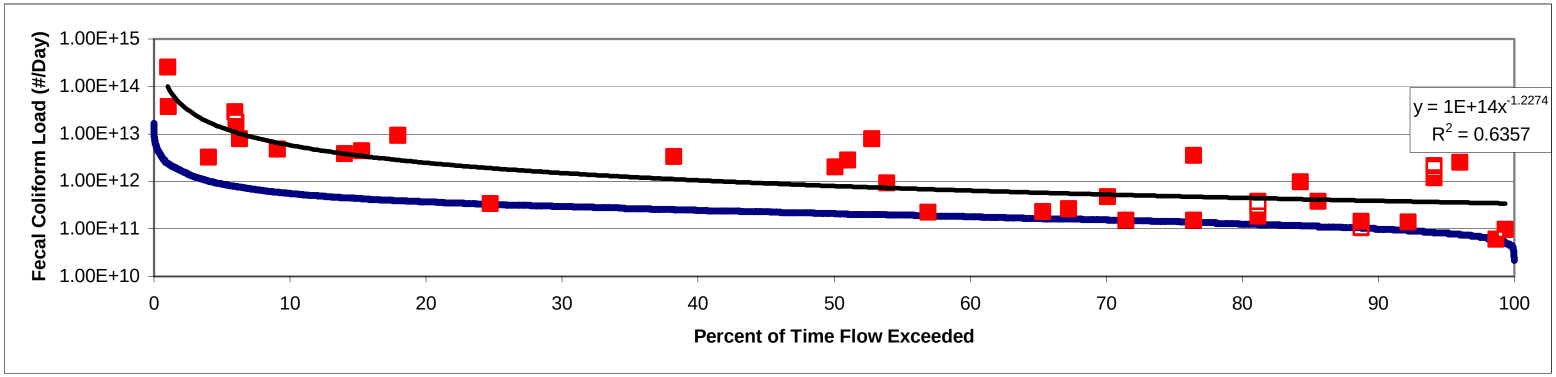
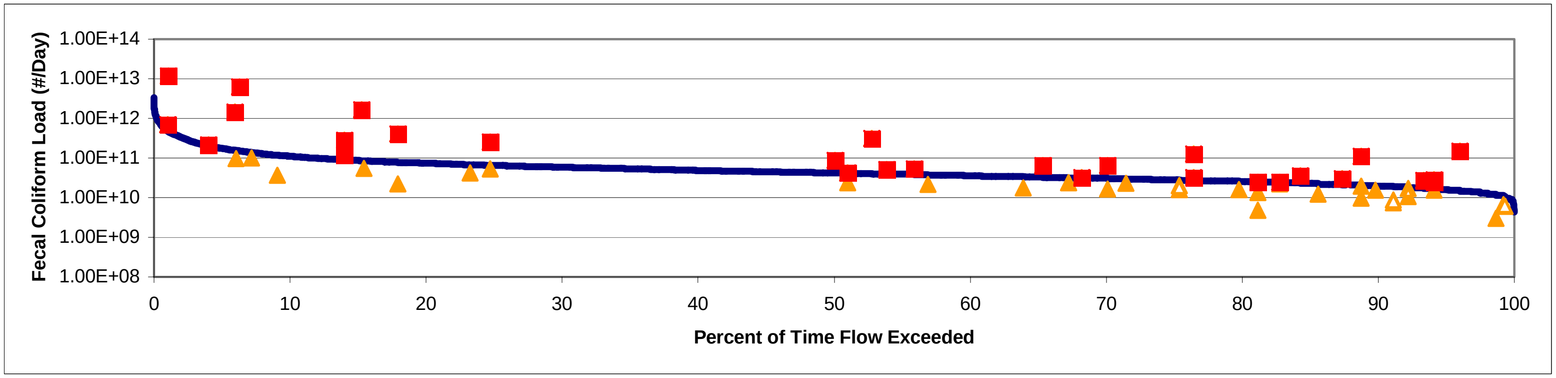



Figure B-22 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-235



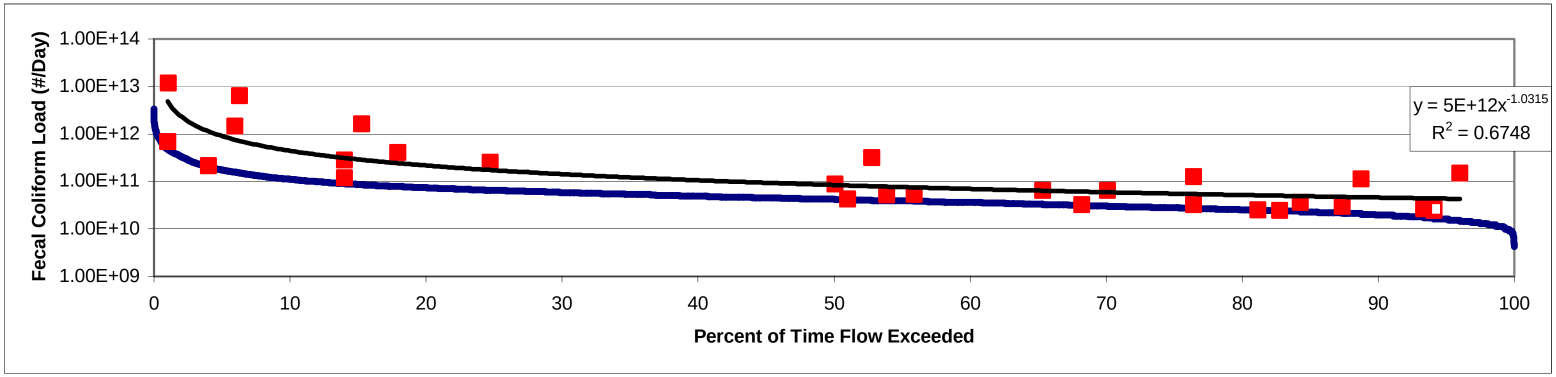
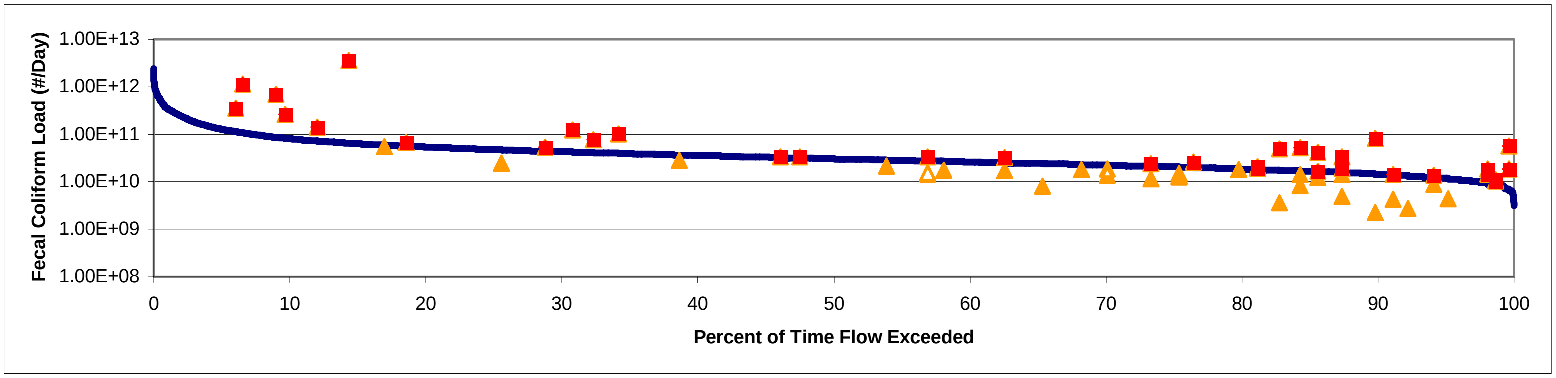



Figure B-23 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-286



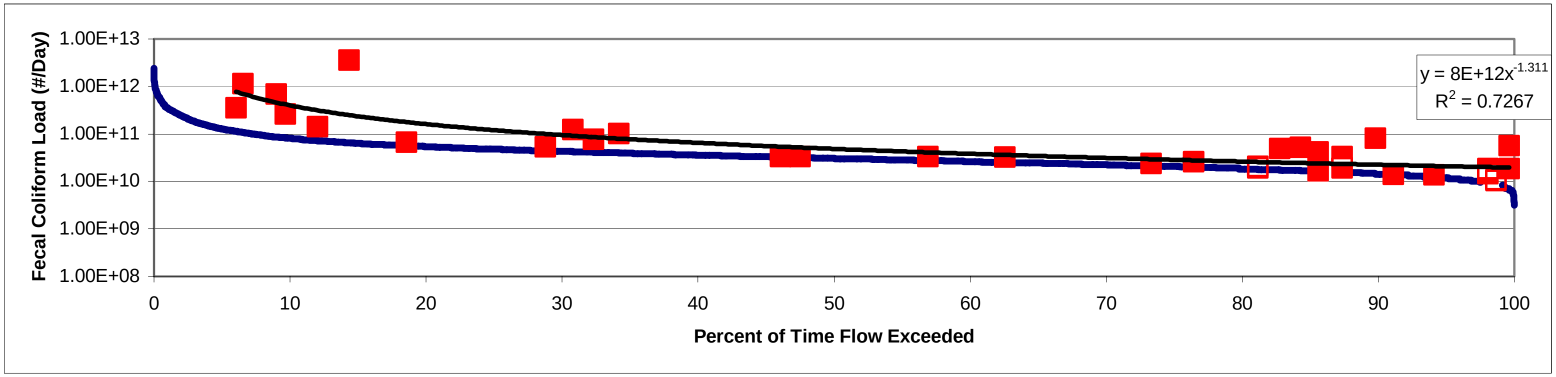
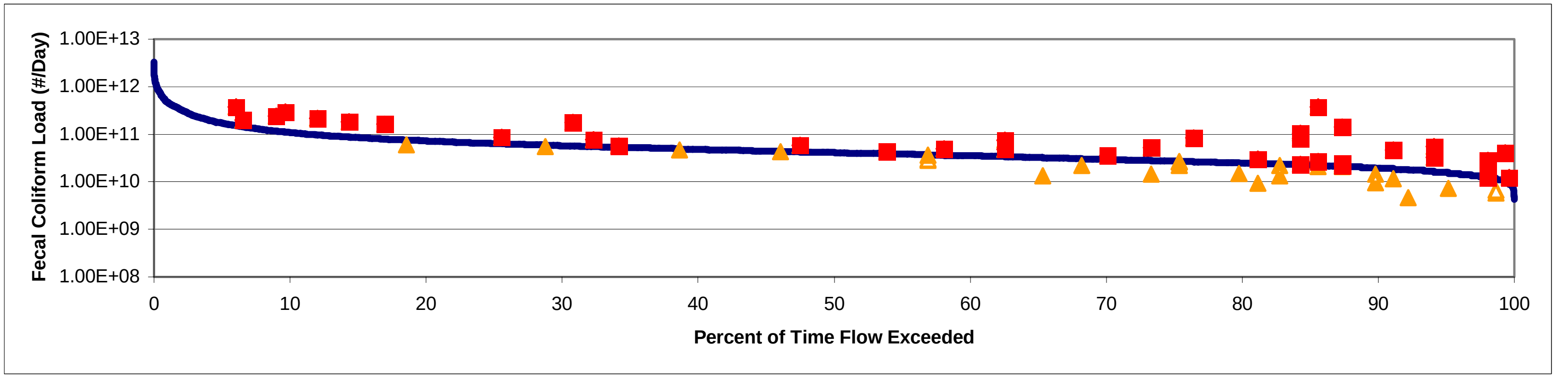



Figure B-24 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-287



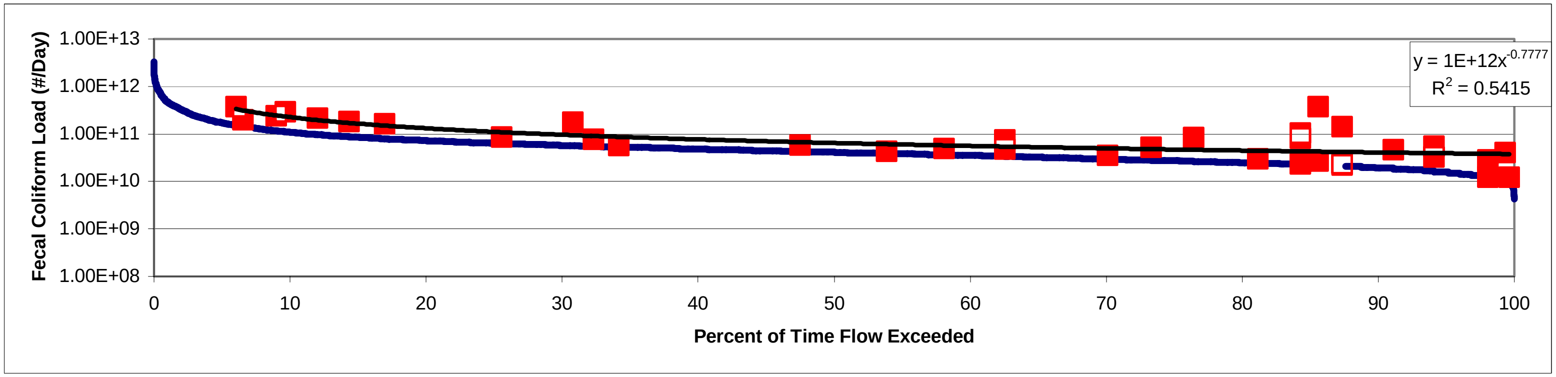
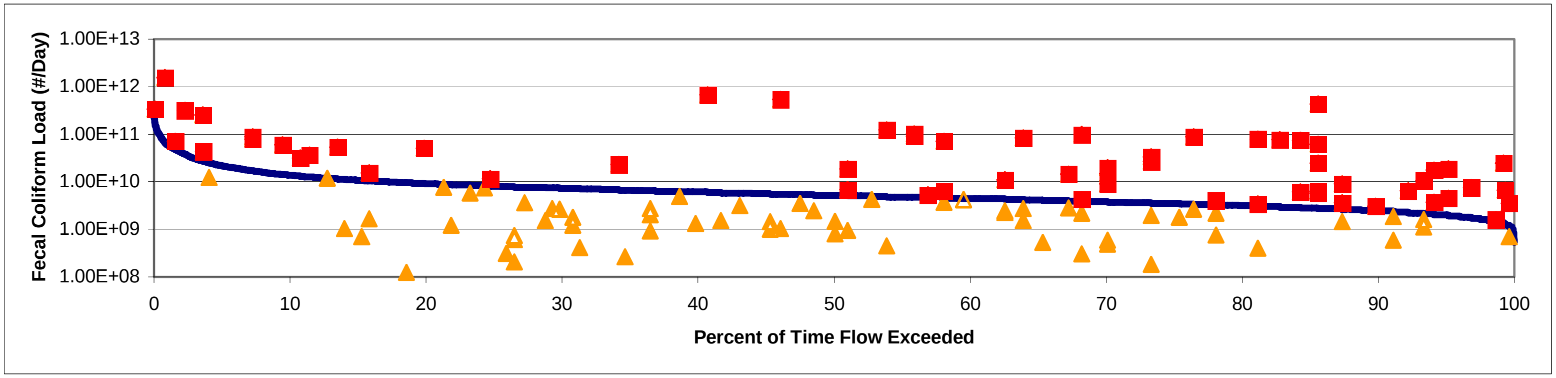



Figure B-25 Load Duration Curve with All Measured Data and Power Trend Line Generated from Violating Fecal Coliform Bacteria Measured at B-321



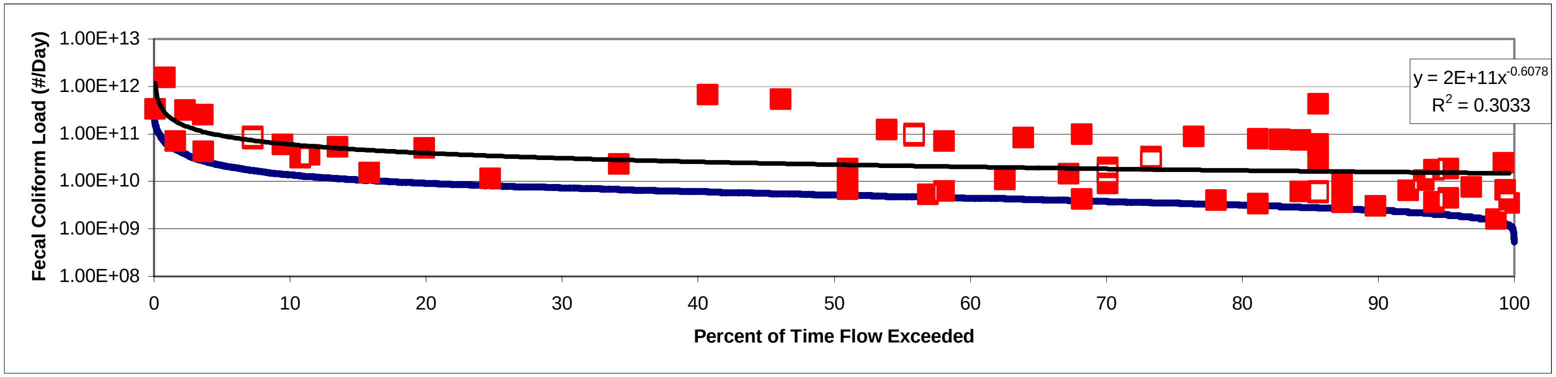



Figure B-26 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02153780

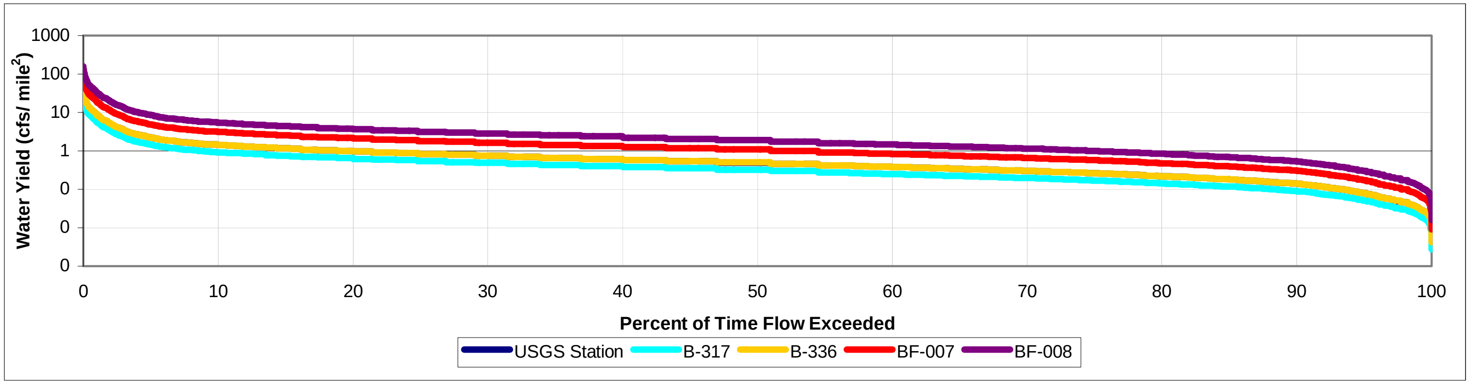


Figure B-27 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02156050

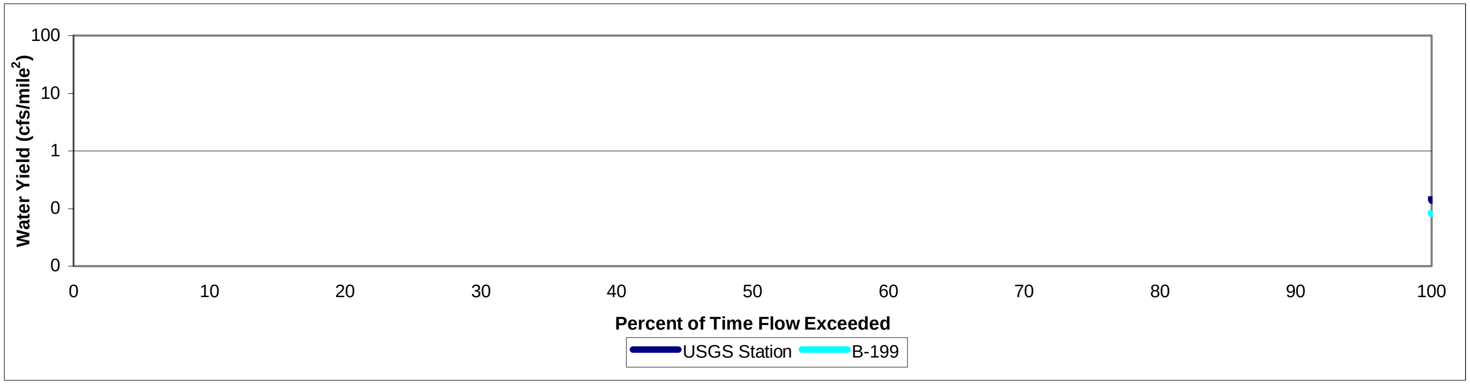
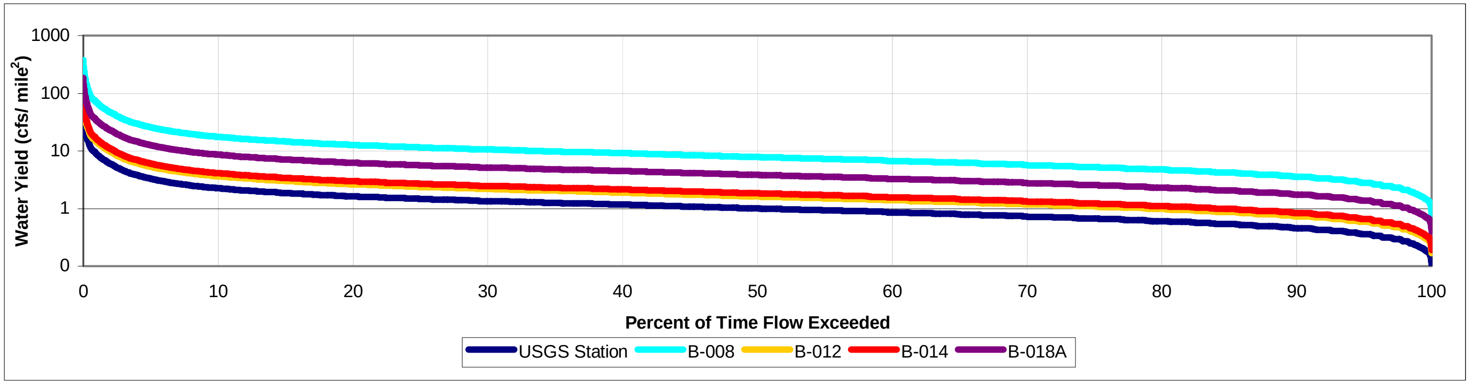


Figure B-28 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02157000



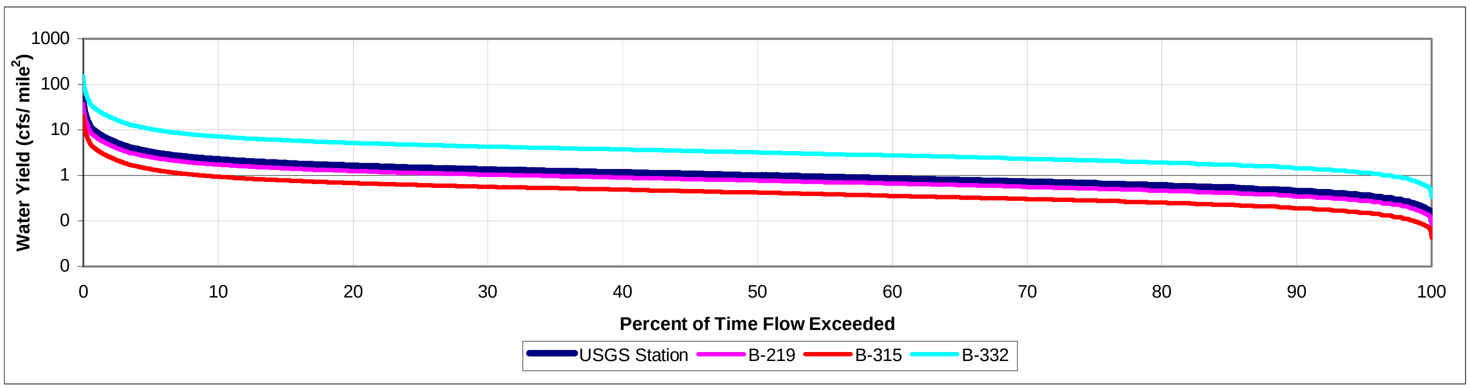



Figure B-29 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02160105

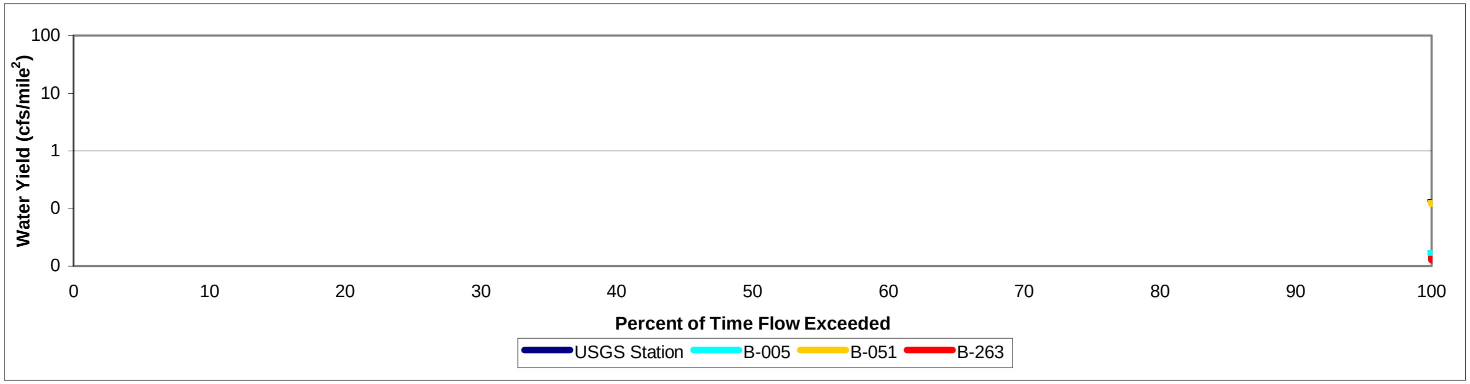
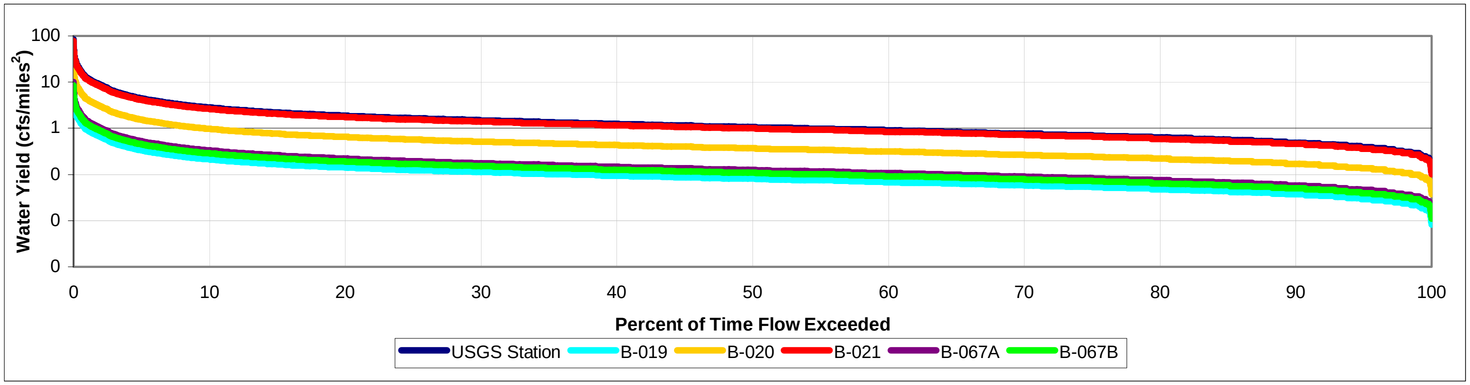
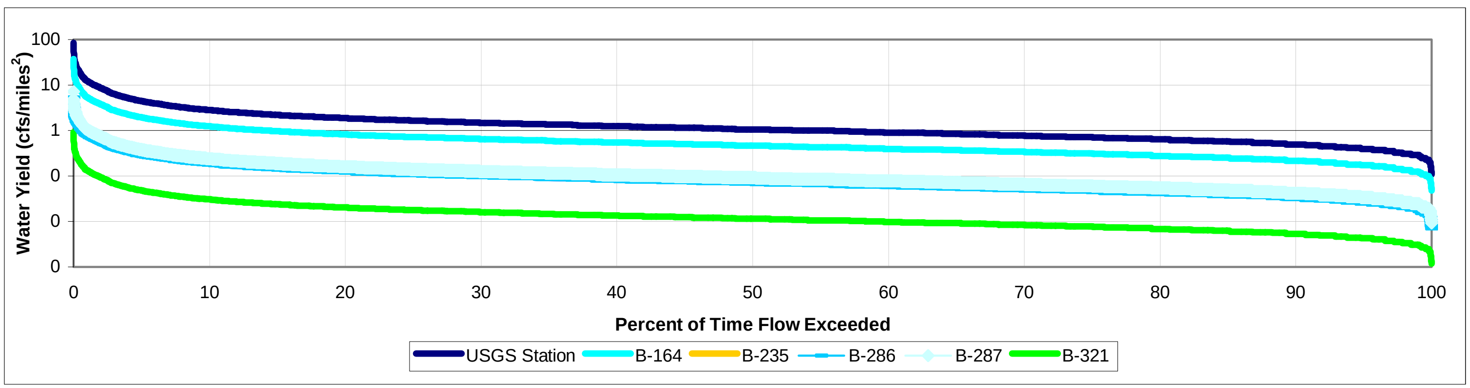


Figure B-30 Water Yield (cubic feet per second per square mile) Based on Measured Daily Streamflow from USGS station 02164000



## APPENDIX C Public Notification

PUBLIC NOTICE

U.S. Environmental Protection Agency, Region 4
Water Management Division
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960

NOTICE OF AVAILABILITY
TOTAL MAXIMUM DAILY LOADS (TMDLS)
FOR WATER AND POLLUTANTS IN THE STATE OF SOUTH CAROLINA

Section 303(d)(1)(C) of the Clean Water Act (CWA), 33 U.S.C. §1313(d)(1)(C), and the U.S. Environmental Protection Agency's implementing regulation, 40 CFR §130.7(c)(1), require the establishment of Total Maximum Daily Loads (TMDLs) for waters identified by states as not meeting water quality standards under authority of §303(d)(1)(A) of the CWA. These TMDLs are to be established levels necessary to implement applicable water quality standards with seasonal variations and a margin of safety, accounting for lack of knowledge concerning the relationship between pollutant loading and water quality.

The waterbody impairments on South Carolina's 303(d) list that will be addressed by the TMDLs are listed below. These impaired waterbodies are located in the Broad River Basin in Greenville, Spartanburg, Newberry and Union Counties.

| List ID | Impairment Description | Water Body Name |
|---|---|---|
| SC-B-021 | FECAL COLIFORM | FAIRFOREST CK AT SC 56 |
| SC-B-020 | FECAL COLIFORM | FAIRFOREST CK AT US 221 S OF SPARTANBURG |
| SC-B-321 | FECAL COLIFORM | FAIRFOREST CK TRIB 200 FT BL S-42-65 |
| SC-B-164 | FECAL COLIFORM | FAIRFOREST CREEK AT S-42-651 3.5 MI SSE OF SPARTANBURG |
| SC-BF-008 | FECAL COLIFORM | FAIRFOREST CREEK AT S-44-16 SW OF UNION |
| SC-BF-007 | FECAL COLIFORM | FAIRFOREST CREEK ON CO RD 12 SW OF JONESVILLE |
| SC-B-019 | FECAL COLIFORM | JIMMIES CK AT S-42-201 2 MI E OF WOODRUFF |
| SC-B-235 | FECAL COLIFORM | KELSEY CK AT S-42-321 |
| SC-B-012 | FECAL COLIFORM | MIDDLE TYGER RIVER AT S-42-63 |
| SC-B-014 | FECAL COLIFORM | MIDDLE TYGER RIVER AT S-42-64 |
| SC-B-199 | FECAL COLIFORM | MITCHELL CK AT CO RD 233 2.3 MI SSW OF JONESVILLE |
| SC-B-317 | FECAL COLIFORM | MUSH CK AT SC 253 BL TIGERVILLE |
| SC-B-018A | FECAL COLIFORM | NORTH TYGER RIVER AT S-42-231, 11 MI S OF SPARTANBURG |
| SC-B-315 | FECAL COLIFORM | NORTH TYGER RIVER TRIB AT UN# RD BL JACKSON #2 EFF |
| SC-B-219 | FECAL COLIFORM | NORTH TYGER RVR AT US 29 7.2 MI W OF SPARTANBURG |
| SC-B-005 | FECAL COLIFORM | SOUTH TYGER RIVER AT S-42-63 |
| SC-B-332 | FECAL COLIFORM | SOUTH TYGER RIVER AT S-42-86, 5 MI NE OF WOODRUFF |

| | | |
|---|---|---|
| SC-B-263 | FECAL COLIFORM | SOUTH TYGER RVR AT SC 290 3.7 MI E OF GREER |
| SC-B-336 | FECAL COLIFORM | TINKER CK AT S-44-278, 9 MI SSE OF UNION |
| SC-B-287 | FECAL COLIFORM | TINKER CK AT UN# CO RD 1.7 MI SSE OF UNION |
| SC-B-286 | FECAL COLIFORM | TINKER CREEK AT RD TO STP 1.3 MI SSE OF UNION |
| SC-B-067B | FECAL COLIFORM | TOSCHS CK AT RD TO SEWAGE PT OFF HWY S-44-92 SW OF UNION |
| SC-B-067A | FECAL COLIFORM | TOSCHS CK AT US 176 2 MI SW OF UNION |
| SC-B-051 | FECAL COLIFORM | TYGER RIVER AT SC 72 5.5 MI SW OF CARLISLE |
| SC-B-008 | FECAL COLIFORM | TYGER RVR AT S-42-50 E. WOODRUFF |

Persons wishing to comment on the proposed TMDLs or to offer new data or information regarding the proposed TMDLs are invited to submit the same in writing no later than August 16, 2004 to the U.S. Environmental Protection Agency, Region 4, Water Management Division, 61 Forsyth Street, S.W., Atlanta, Georgia 30303-8960, ATTENTION: Ms. Sibyl Cole, Standards, Monitoring, and TMDL Branch.

A copy of the proposed TMDLs can be obtained through the Internet or by contacting Ms. Cole at (404) 562-9437 or via electronic mail at cole.sibyl@epa.gov. The URL address for the proposed TMDLs is:
http://www.epa.gov/region4/water/tmdl/tennessee/index.htm#sc.
The proposed TMDLs and supporting documents, including technical information, data, and analyses, may be reviewed at 61 Forsyth Street, S.W., Atlanta, Georgia, between the hours of 8 AM and 4:30 PM, Monday through Friday. Persons wishing to review this information should contact Ms. Cole to schedule a time for that review.

http://www.epa.gov/region

/s/

James D. Giattina, Director — Date
Water Management Division
Region 4
U.S. Environmental Protection Agency

**NO COMMENTS RECEIVED**

# APPENDIX D MOVE.1

**Constructing Flow Curves Using MOVE.1**

The concept of record extension is to transfer the characteristics of distribution shape, serial correlation, and seasonality from the base station to the short-record station with adjustments of location and scale appropriate to the short-record station. MOVE.1 is a statistical technique developed by the USGS (Hirsch, 1982) for extending discharge records at partial or discontinued gages using continuous records at a base station having a common period of record as the partial station. Record extension is based on the following equation:

$$Y(i) = m(y_1) + (S(y_1)/S(x_1))(x(i) - m(x_1)) \qquad \text{Equation 1}$$

Where: Y = discharge at partial record station on particular date
$m(y_1)$ = mean value at partial record station
$S(y_1)$ = standard deviation of discharge record at partial station
$S(x_1)$ = standard deviation of discharge record at continuous station
X(i) = discharge at continuous gage on a particular date
$m(x_1)$ = mean value at continuous record station

Application of the MOVE.1 technique is explained below; however, for more information on the derivation of the equations used in the analysis, please refer to Hirsch (1982).

The record extension procedure can be easily performed in a spreadsheet, such as Excel, having the “analysis woolpack” feature loaded as an add-in program. In Excel, the “descriptive statistic” feature in the “analysis woolpack” is used to compute the complex statistical parameters described in Equation 1. The first step in utilizing MOVE.1 is to compute the logarithms of the discharges at each gage during the concurrent time period. By selecting the “descriptive statistic” feature from the data analysis menu (in Excel, this is located under the “tools” menu bar), and highlighting the cells containing the logarithms of the discharges at both the partial and continuous record stations, the summary statistics used in Equation 1 can be calculated. Flows at other time periods at the partial record station can be estimated by using Equation 1, the summary statistics from the analysis woolpack, and flow at the continuous record station.

A partial flow record is available for the North Tyger River near Fairmont at USGS station 02157000. MOVE.1 was used to establish the missing period of record between 1989 and 2001 for the purpose of developing loads for water quality samples. The partial station was matched with a USGS station with complete records. The USGS station 02160105 on the Tyger River near Delta was used to extend the record at USGS station 02157000. The concurrent time period for each pair was used in the MOVE.1 analysis. Statistical parameters derived from the MOVE.1 analysis are shown in Table D-1. The resulting flow duration curve is presented in Figure D-1.

Table D-1 Statistical Parameters Derived from the MOVE.1 Analysis Comparing USGS 02157000 and USGS 02160105

| X | | Y | |
|---|---|---|---|
| ***log USGS 02160105*** | | ***log USGS 02157000*** | |
| | | | |
| Mean | 2.878924437 | Mean | 1.663064606 |
| Standard Error | 0.004364591 | Standard Error | 0.0040405 |
| Median | 2.878521796 | Median | 1.653212514 |
| Mode | 3.041392685 | Mode | 1.556302501 |
| Standard Deviation | 0.323068192 | Standard Deviation | 0.299078896 |
| Sample Variance | 0.104373057 | Sample Variance | 0.089448186 |
| Kurtosis | 1.038952146 | Kurtosis | 1.821416656 |
| Skewness | 0.492513072 | Skewness | 0.535553667 |
| Range | 2.423747272 | Range | 2.577791417 |
| Minimum | 1.991226076 | Minimum | 0.662757832 |
| Maximum | 4.414973348 | Maximum | 3.240549248 |
| Sum | 15773.62699 | Sum | 9111.930978 |
| Count | 5479 | Count | 5479 |
| Standard Deviation Y / Standard Deviation X = 0.926 | | | |

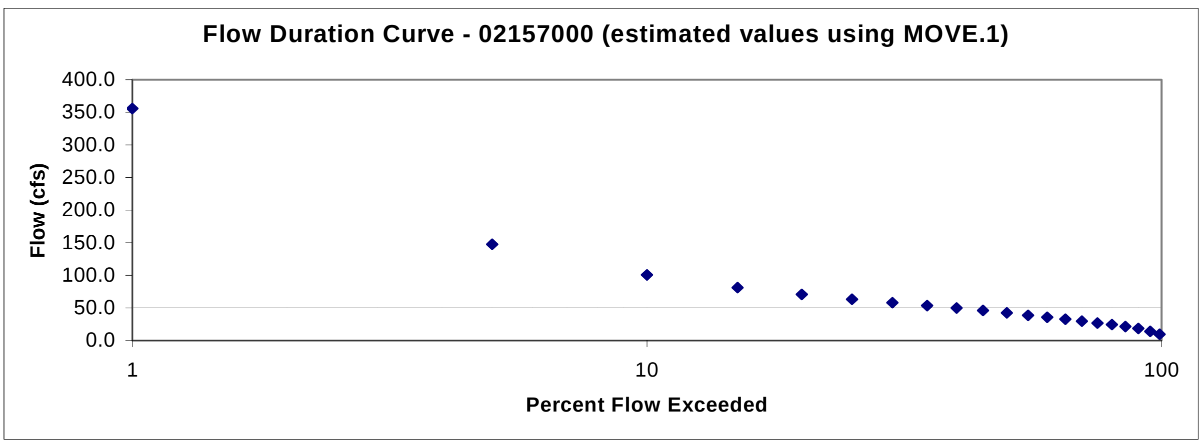



Figure D-1 Flow Duration Curve for the Tyger River near Fairmont (Estimated Using MOVE.1)