Office of Water Quality
Total Maximum Daily Load Program

Total Maximum Daily Load for *Escherichia coli* (*E. coli*) For the Sugar Creek Watershed, Hancock, Henry, Johnson, Madison, and Shelby Counties

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Introduction

Section 303(d) of the Federal Clean Water Act and the United States Environmental Protection Agency's (USEPA's) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations (CFR), Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting Water Quality Standards (WQS). TMDLs provide states a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the quality of their water resources. The purpose of this TMDL is to identify the sources and determine the allowable levels of *E. coli* bacteria that will result in the attainment of the applicable WQS in the Sugar Creek watershed in Hancock, Henry, Johnson, Madison, and Shelby Counties in Indiana.

Background

In 1998, Sugar Creek at Gibson Ditch and Sugar Creek at McCue Medsker Ditch were listed on Indiana's 303(d) list as impaired for *E. coli*. In 2002, Sugar Creek at Barret Ditch, Sugar Creek at Boyd Ditch, and Little Sugar Creek at Cutsinger Ditch were added to Indiana's 303(d) list as impaired for *E. coli*. In 2004, Sugar Creek Smith-Johnson Ditch and Sugar Creek at Needham were added to Indiana's 303(d) list as impaired for *E. coli*. In 2006, Sugar Creek – Downstream of Grain Creek, Krikhoff Ditch, Sugar Creek at Broadripple Camp, Herriotts Creek upstream of Pisgah Lake, and Sugar Creek at Herriotts Creek were all added to Indiana's 303(d) list as impaired for *E. coli*.

This TMDL will address approximately 69.50 miles of the Sugar Creek watershed in Hancock, Henry, Johnson, Madison, and Shelby Counties where recreational uses are impaired by elevated levels of *E. coli* during the recreational season. The Sugar Creek watershed is located in eastern Indiana (Figure 1). All of the twelve (12) segments of the listed streams for this TMDL are located in the Driftwood Basin in hydrologic unit code 05120204. The description of the study area, its topography, and other particulars are as follows:

Waterbody Name	Segment ID	Length (Miles)	Impairment
Sugar Creek - Downstream Grain Creek	INW0461_T1029	3.64	*E. coli*
Sugar Creek- Barrett Ditch	INW0463_T1030	10.03	*E. coli*
Kirkhoff Ditch	INW0464_T1003	1.58	*E. coli*
Sugar Creek - Boyd Ditch	INW0464_T1031	6.93	*E. coli*
Sugar Creek Smith - Johnson Ditch	INW0465_T1032	8.84	*E. coli*
Sugar Creek - Broad Ripple Camp	INW0481_T1034	4.09	*E. coli*
Sugar Creek - Needham	INW0485_T1035	6.21	*E. coli*
Little Sugar Creek - Cutsinger Ditch	INW0488_00	8.3	*E. coli*
Sugar Creek - Gibson Ditch	INW0489_T1036	2.03	*E. coli*
Sugar Creek - McCue Medsker Ditch	INW048A_T1037	10.12	*E. coli*
Herriotts Creek Upstream of Pisgah Lake	INW0498_00	2.61	*E. coli*
Sugar Creek - Herriotts Creek	INW0498_T1038	5.12	*E. coli*

Historic data collected by IDEM's Assessment branch indicates high levels of *E. coli* in Sugar Creek dating back to 1991 (Appendix 1). High levels of *E. coli* were also noted in Sugar Creek in 1992, 1993, 1995, 1996, and 1997. More recent samples taken in 2000 and 2001 also indicate elevated levels of *E. coli* in Sugar Creek. Violations in these historic samples ranged from 260 MPN/100 mL to 7,900 MPN/100 mL (MPN = Most Probable Number). In 1997, high levels of *E. coli* were also noted on Little Sugar Creek. Three (3) samples were taken in 1997 and all violate the single sample maximum of 235 per 100 mL. The violations range from 430 MPN/100 mL to 3,400 MPN/100 mL (Attachment A, Figure 2).

IDEM conducted an intensive study of the Sugar Creek watershed in 2002 (Attachment A). Sites 1 through 11 and site 15 were sampled from September 9, 2002 through October 9, 2002. Sites 12 through 13 were sampled from July 2, 2002 through July 30, 2002. Sites were sampled for different projects resulting in sites being sampled during different months. Sites 1 through 10 were sampled for the 2002 Sugar Creek *E. coli* project. Sites 11 and 15 were sampled for the 2002 *E. coli* Muscatatuck and Upper East Fork White River project. Sites 12 through 14 were sampled for the 2002 Youngs Creek TMDL Assessment. All sites were sampled five (5) times equally spaced over the 30 day period. Of the fifteen (15) sites, ten (10) violated the geometric mean for *E. coli*. Of the five (5) sites that did not violate the geometric mean, one (1) site violated the single sample maximum for *E. coli*. The geometric means ranged from 17.14 MPN/100 mL at site 10 to 3846.25 MPN/100 mL at site 11 (MPN = Most Probable Number).

Volunteers for Hoosier Riverwatch sampled Sugar Creek for *E. coli* once in 2000 and once in 2004 (Appendix 2). These samples were collected using the Coliscan Easygel Method. Neither sample indicated high levels of *E. coli* in Sugar Creek. The sample taken in 2000 occurred in November, which is outside of the recreational season (April 1 to October 31).

The TMDL development schedule corresponds with IDEM's basin-rotation water quality monitoring schedule. To take advantage of all available resources for TMDL development, impaired waters are scheduled according to the basin-rotation schedule unless there is a significant reason to deviate from this schedule. Waterbodies are scheduled based on the following:

1) Waterbodies may be given a high or low priority for TMDL development depending on the specific designated uses that are not being met, or in relation to the magnitude of the impairment.

2) TMDL development of waterbodies where other interested parties, such as local watershed groups, are working on alleviating the water quality problem may be delayed to give these other actions time to have a positive impact on the waterbody. If water quality standards still are not met, then the TMDL process will be initiated.

3) TMDLs that are required due to water quality violations relating to pollutant parameters where no EPA guidance is available may be delayed to give EPA time to develop guidance.

This TMDL was scheduled based on the data available from the basin-rotation schedule, which represents the most accurate and current information available on water quality within waterbodies covered by this TMDL.

Water quality duration curves were created using data collected by IDEM's Assessment Branch. A flow duration interval is described as a percentage. Zero (0) percent corresponds to the highest stream discharge (flood condition) and 100 percent corresponds to the lowest discharge (drought condition). The *E. coli* values at sites 1, 9, 11, and 14 were plotted with the corresponding flow duration interval to show the *E. coli* violations of the single-sample maximum standard and geometric mean standard during the recreational season. Site 1 (WED060-0011) is located on Pee Dee Ditch at CR 900 N. Site 9 (WED060-0017) is located on Sugar Creek at Smith-Johnson Ditch at CR 200 S. Site 11 (WED080-0014) is located on Little Sugar Creek at Cutsinger Ditch at CR 350 N west of CR 700 E. Site 14 (WED090-0026) is located on Sugar Creek at Herriotts Creek at North Street and Schoolhouse Road. These sites were all sampled in 2002. These sampling sites were chosen for the water quality duration curve discussion because they are representative of the hydrodynamics of the Sugar Creek watershed (Attachment B).

Numeric Targets

The impaired designated use for the waterbodies in the Sugar Creek watershed is for total body contact recreational use during the recreational season, April 1 through October 31.

327 IAC 2-1-6(d) establishes the total body contact recreational use *E. coli* Water Quality Standard (WQS[1]) for all waters in the non-Great Lakes system as follows:

> *E. coli* bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period.

The sanitary wastewater *E. coli* effluent limits from point sources in the non-Great Lakes system during the recreational season, April 1 through October 31, are also covered under 327 IAC 2-1-6(d).

For the Sugar Creek watershed during the recreational season (April 1 through October 31) the target level is set at the *E. coli* WQS of 125 per one hundred milliliters as a 30-day geometric mean based on not less than five samples equally spaced over a thirty day period. This geometric mean *E. coli* WQS allows for the best characterization of the watershed. Therefore, the geometric mean standard is being used as the target for this *E. coli* TMDL.

[1] *E. coli* WQS = 125 cfu/100mL or 235 cfu/100mL; 1 cfu (colony forming units)= 1 mpn (most probable number)

Source Assessment

<u>Watershed Characterization</u>

The Sugar Creek watershed ranges over 5 Counties; 43.73% of the watershed is in Hancock County, 26.75% is in Johnson County, 19.20% is in Shelby County, 6.63% is in Henry County, and 3.69% is in Madison County. The headwaters of Sugar Creek originate in western Henry County, the southeastern portion of Madison County and northeast Hancock County. Sugar Creek flows west through Hancock County and takes a southern turn to flow southwest through Shelby and Johnson Counties. Little Sugar-Cutsinger Ditch is impaired for *E. coli* and flows southeast through the eastern portion of Johnson County to meet with Sugar Creek just after it enters Johnson County. Herriotts Creek Upstream of Pisgah Lake flows to the southeast to join Sugar Creek in southern Johnson County (Figure 1).

Landuse information was assembled in 1992 using the Gap Analysis Program (GAP). In 1992, approximately 89.26% of the landuse in the Sugar Creek watershed was agriculture. The remaining landuse for the Sugar Creek watershed consisted of approximately 6.00% forest, 3.33% wetland, 1.11% urban, and 0.30% water (Figure 3). In 1970, 94.47% of the Sugar Creek watershed was agriculture. The rest of the landuse in Sugar Creek consisted of 2.80% urban, 2.46 % forest, and 0.27 % water (Figure 4).

Wildlife is a known source of *E. coli* impairments in waterbodies. Many animals spend time in or around waterbodies. Deer, geese, ducks, raccoons, turkeys, and other animals all create potential sources of *E. coli*. Wildlife contributes to the potential impact of contaminated runoff from animal habitats, such as urban park areas, forest, and cropland.

Failing septic tanks are known sources of *E. coli* impairment in waterbodies. Conversations with the staff from the Hancock, Henry, Johnson, Madison, and Shelby County Health Departments indicate that septic system failure does occur. Accurate estimates of homes using septic systems in these counties are not available at this time (Clidence, Pease, Pursley, Schmidt, and Smith, 2005 Personal Communication); however, Henry County has had a septic system permitting system in place since the 1970's (Smith, 2005 Personal Communication). No tangible septic failure rate has been established by any of the local Health Departments at this time (Clidence, Pease, Pursley, Schmidt, and Smith, 2005 Personal Communication).

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

There are nine (9) NPDES permitted facilities in the Sugar Creek watershed (Figure 5, Table 1). Three (3) of the nine (9) permitted dischargers, Act III Estates, Arrowhead Mobile Home Park, and Eden Elementary School, have *E. coli* limits in their permits.

Information on the compliance history of these three facilities with *E. coli* limits is as follows:

- Act III Estates had no reported violations of the *E. coli* limits.
- Arrowhead Mobile Home Park had *E. coli* limits added in 2005 and has no reported violations of the *E. coli* limits.
- Eden Elementary School had four (4) violations in the past five (5) years, although, none of these violations occurred during the sampling event.
- There are no open enforcement cases against Act III Estates, Arrowhead Mobile Home Park, or Eden Elementary School
- Since these facilities do not have past or open enforcement cases, these facilities are not considered to be major contributors of *E. coli* to Sugar Creek

Three (3) of the nine (9) NPDES permitted facilities have total residual chlorine (TRC) limits in their permits. They are Creekside Mobile Home Park, New Palestine Municipal STP, and the Sugar Creek Utility Company. These dischargers have a sanitary component in their discharge. Previously, facilities with design flows under 1 MGD (million gallons per day), typically minor municipals and semipublics, were not required to have *E. coli* effluent limits or conduct monitoring for *E. coli* bacteria, provided they maintained specific total residual chlorine levels in the chlorine contact tank. The assumption was that as long as chlorine levels were adequate in the chlorine contact tank, the *E. coli* bacteria would be deactivated and compliance with the *E. coli* WQS would be met by default. The original basis for allowing chlorine contact tank requirements to replace bacteria limits was based on fecal coliform, not *E. coli*. No direct correlation between the total residual chlorine levels and *E. coli* bacteria can be conclusively drawn. Further, it has been shown that exceedances of *E. coli* bacteria limits may still occur when the chlorine contact tank requirements are met.

Information on the compliance history of these three facilities with TRC limits is as follows:

- Creekside Mobile Home Park had three (3) violations of the TRC limit during the past five (5) years; however, none of these violations occurred during the sampling event.
- New Palestine Municipal STP had nine (9) violations of the TRC limit in the past five (5) years, one (1) violation occurred within the sampling event.
- Sugar Creek Utility Company has had three (3) violations of the TRC limit in the past 5 years, no violations occurred during the sampling event.
- As there are no past or open enforcement cases against any of these facilities in relation to *E. coli*, they are not considered to be major contributors of *E. coli* to Sugar Creek; although the violation at the New Palestine Municipal STP during the sampling event may have contributed to high *E. coli* values.

Due to the complications of comparing total residual chlorine to *E. coli*, it is difficult to determine to what extent, if any, these three (3) dischargers could be a source of *E. coli* in the Sugar Creek watershed.

The remaining three (3) of nine (9) dischargers, Franklin Plant IAWC, Shelby Petroleum, Inc., and Sonoco Flexible Packaging, do not have *E. coli* or total residual chlorine limits in their permits. None of these three (3) dischargers have a sanitary component to their discharge; therefore, *E. coli* limits do not apply to their permits. These permitted dischargers are not contributing to the sources of *E. coli* in the Sugar Creek watershed.

As the six (6) dischargers with sanitary components do not have a history of significant non-compliance, these dischargers are not considered to be major contributors of *E. coli* to Sugar Creek.

<u>Storm Water General Permit Rule 13</u>

There are five (5) municipal separate storm sewer systems (MS4) communities in the Sugar Creek watershed. The MS4 communities are Hancock County (INR040128), Johnson County (INR040045), Madison County (INR040111), New Palestine (INR040070), and Edinburgh (INR040026). Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). It is difficult to determine if these MS4 communities are a significant source of *E. coli* in the Sugar Creek watershed.

<u>Combined Sewer Overflows (CSO)</u>

There are zero (0) CSO communities in the Sugar Creek watershed.

Confined Feeding Operations and Concentrated Animal Feeding Operations

The removal and disposal of the manure, litter, or processed wastewater that is generated as the result of confined feeding operations falls under the regulations for confined feeding operations (CFOs) and concentrated animal feeding operations (CAFOs). There are six (6) active CFOs and zero (0) CAFOs in the Sugar Creek watershed (Figure 6). The CFOs are Lantz, Lawyer, McFarland Dairy, Welty Farms # 1, Welty Farms # 2, and Wilson. None of the CFOs are considered a CAFO (Table 2). The CFO and CAFO regulations (327 IAC 16, 327 IAC 15) require operations "not cause or contribute to an impairment of surface waters of the state." The currently active animal operations in the Sugar Creek watershed have no open enforcement actions at this time. Therefore, these operations are not considered major sources of *E. coli* for the Sugar Creek watershed TMDL.

There are many smaller livestock operations in the watershed. These operations, due to their small size, are not regulated under the CFO or CAFO regulations. These operations may still have an impact on the water quality and the *E. coli* impairment. No specific information on these small livestock operations is currently available for the Sugar Creek watershed; however, it is believed that these small livestock operations may be a source of the *E. coli* impairment.

Linkage Analysis and *E. coli* Load Duration Curves

The linkage between the *E. coli* concentrations in the Sugar Creek watershed and the potential sources provides the basis for the development of this TMDL. The linkage is defined as the cause and effect relationship between the selected indicators and the sources. Analysis of this relationship allows for estimating the total assimilative capacity of the stream and any needed load reductions. Analysis of the data for the Sugar Creek watershed indicates that a significant amount of the *E. coli* load enters the Sugar Creek watershed through both wet (nonpoint) and dry (point) weather sources.

To further investigate the potential sources mentioned above, an *E. coli* load duration curve analysis, as outlined in an unpublished paper by Cleland (2002), was developed for each sampling site in the Sugar Creek watershed. The load duration curve analysis is a relatively new method utilized in TMDL development. The method considers how stream flow conditions relate to a variety of pollutant loadings and their sources (point and nonpoint).

In order to develop a load duration curve, continuous flow data is required. The USGS gage for Sugar Creek (03361650) located in New Palestine, Indiana in Hancock County was used for the development of the *E. coli* load duration curve analysis for sample sites 1 through 10 for the Sugar Creek watershed TMDL. The USGS gage for Sugar Creek (03362500) near Edinburgh, Indiana in Johnson County was used for sample sites 11 through 15. Both of these USGS gages are located on Sugar Creek.

The flow data is used to create flow duration curves, which display the cumulative frequency of distribution of the daily flow for the period of record. The flow duration curve relates flow values measured at the monitoring station to the percent of time that those values are met or exceeded. Flows are ranked from extremely low flows, which are exceeded nearly 100 percent of the time, to extremely high flows, which are rarely exceeded. Flow duration curves are then transformed into load duration curves by multiplying the flow values along the curve by applicable water quality criteria values for *E. coli* and appropriate conversion factors. The load duration curves are conceptually similar to the flow duration curves in that the x-axis represents the flow recurrence interval and the y-axis represents the allowable load of the water quality parameter. The curve representing the allowable load of *E. coli* was calculated using the daily and geometric mean standards of 235 per 100 mL and 125 per 100 mL, respectively. The final step in the development of a load duration curve is to add the water quality pollutant data to the curves. Pollutant loads are estimated from the data as the product of the pollutant concentrations, instantaneous flows measured at the time of sample collection, and appropriate conversion factors. In order to identify the plotting position of each calculated load, the recurrence interval of each instantaneous flow measurement was defined. Water quality pollutant monitoring data are plotted on the same graph as the load duration curve that provides a graphical display of the water quality conditions in the waterbody. The pollutant monitoring data points that are above the target line exceed the water quality standards (WQS); those that fall below the target line meet the WQS (Mississippi DEQ, 2002).

Load duration curves were created for all the sampling sites in the Sugar Creek watershed. However, sampling sites 1, 9, 11, and 14 provide the best description of the sources of *E. coli* to the Sugar Creek watershed and will be discussed in this TMDL (Figure 2, Attachment C). Site 1 (WED060-0011) is located on Pee Dee Ditch at CR 900 N. Site 9 (WED060-0017) is located on Sugar Creek at Smith-Johnson Ditch at CR 200 S. Site 11 (WED080-0014) is located on Little Sugar Creek at Cutsinger Ditch at CR 350 N west of CR 700 E. Site 14 (WED090-0026) is located on Sugar Creek at Herriotts Creek at North Street and Schoolhouse Road. These sites were intensively sampled for *E. coli* in 2002. The data indicate that the largest exceedances of *E. coli* Water Quality Standard (WQS) in the Sugar Creek watershed occur during dry events as noted by the diamonds above the line to the far right on the graphs (Attachment C).

While there are point source contributions, compliance with the numeric *E. coli* WQS in the Sugar Creek watershed most critically depends on controlling nonpoint sources using best management practices (BMPs). If the *E. coli* inputs can be controlled, then total body contact recreation use in the Sugar Creek watershed will be protected.

<u>Water Quality Duration Curves</u>

The linkage between the *E. coli* concentrations in the Sugar Creek watershed and the potential sources of *E. coli* provides the basis for the development of this TMDL. Analysis of this relationship allows for estimating the total assimilative capacity of the stream and any needed load reductions. Water quality duration curves were created for the sampling sites in the Sugar Creek watershed that were sampled by IDEM in 2002. A flow duration interval is described as a percentage. Zero (0) percent corresponds to the highest stream discharge (flood condition) and 100 percent corresponds to the lowest discharge (drought condition). These sampling sites are representative of the hydrodynamics of the Sugar Creek watershed (Attachment B). The following section will discuss the water quality duration curves and the linkage to sources of *E. coli* in the Sugar Creek watershed.

Water quality duration curves were created for four (4) of the fifteen (15) sampling sites in the Sugar Creek watershed (Attachment B). Site 1 (WED060-0011) is located in the headwaters of Sugar Creek in Pee Dee Ditch at CR 900 N in northeastern Hancock County. This site is located in an agricultural area with thin forested buffer strips on either side of the stream between the corn fields and the stream. This site had a geometric mean of 94.87 MPN/100 mL (MPN = Most Probable Number). The *E. coli* Water Quality Standard (WQS) is not violated at this site during the 2002 intensive survey; however, this site was previously listed as impaired for *E. coli* based on earlier data. This stream segment will be delisted in the 2006 listing cycle due to reassessment. During the 2002 sampling event, there was an exceedance of the single sample maximum at low flow of 1,553.07 MPN/100 mL. This exceedance occurred at the highest flow recorded during the sampling event, indicating that the exceedance occurred during a rain event. Violations at low flow indicate point source inputs of *E. coli* to the stream, which include straight pipe discharge (WLA = 0) and cattle and other wildlife in the streams. Since the highest exceedance occurred at the highest flow within the sampling period, it is likely that other sources that are commonly associated with mid-range flows may also contribute to the *E. coli* in the stream, including failing septic systems and MS4 discharges.

Site 9 (WED060-0017) is located on Sugar Creek at Smith-Johnson Ditch on CR 200 S in southwestern Hancock County. This site is located in an agricultural area with sparse buffers between the stream and the fields. This site had a geometric mean of 309.27 MPN/100 mL. During the 2002 sampling event, the highest exceedance of the single sample maximum was 920.8 MPN/100 mL, which occurred at the highest flow recorded during the sampling event. According to the water quality duration curves, *E. coli* violations occurred more consistently at site 9 than at site 1. More consistent violations at site 9 indicate a more constant source of *E. coli* at site 9 than at site 1. Violations at site 9 occurred in the low flow range indicating that sites 1 and 9 have similar sources of input. Since the highest exceedance occurred at the highest flow within the sampling period, it is likely that other sources that are commonly associated with mid-range flows may also contribute to the *E. coli* in the stream, including failing septic systems, MS4 discharge, and cattle and other wildlife in the stream.

Site 11 (WED080-0014) is located on Little Sugar Creek at Cutsinger Ditch off of CR 350 N. This site is located in eastern Johnson County and is in an agricultural area with homes. A manicured lawn is next to the stream and animals have direct access to the stream as evidence of animals in the stream was observed. This site had a geometric mean of 3,846.25 MPN/100 mL. The highest violation of the single sample maximum was 9,804 MPN/100 mL. This violation occurred at the highest flow recorded during the sampling event. The *E. coli* violations were more consistent at site 11 than at site 9. Again, these violations occurred in the low flow range indicating similar sources of input as sites 1 and 9. Since the highest exceedance occurred at the highest flow within the sampling period, it is likely that other sources that are commonly associated with mid-range flows may also contribute to the *E. coli* in the stream, including failing septic systems, MS4 discharges, and cattle and other wildlife in the stream.

Site 14 (WED090-0026) is located on Sugar Creek at Herriotts Creek off of North Road. This site is in southeastern Johnson County, is a forested wetland area, and is surrounded by a wooded area. This site had a geometric mean of 217.68 MPN/100 mL. The two highest exceedances of the single sample maximum of 820 MPN/100 mL and 500 MPN/100 mL occurred at the two highest flows recorded during this sample period. The *E. coli* violations are not as constant at site 14 as at sites 9 and 11. Violations occurred during the mid-range flows indicating that sources of *E. coli* at this site might include failing septic systems, MS4 discharge, and cattle and other wildlife in the stream.

Source Linkage

The landuse in this watershed is predominately agricultural. Row crops comprise 68.84% of the landuse. The soils in this watershed necessitate the use of field tiles to drain excess water from the fields. These field tiles then drain to the nearest stream. Field tiles are not themselves sources of *E. coli*, but they can carry *E. coli* from land applied manure, runoff from the fields and pastures, and other sources of *E. coli* not adjacent to the streams. The high *E. coli* values during mid-range to high flow conditions indicates the presence of *E. coli* transportation by field tiles.

Pasture is considered 7.31% of the landuse. This indicates the presence of non-regulated smaller animal operations in this watershed. Animals located in these smaller animal operations are not as likely to enter a stream during high flow conditions. Since there is a continuous source of *E. coli* present in this watershed during dry conditions, this would indicate that animals have direct access to the stream.

Wildlife is a known source of *E. coli*. The predominant agricultural and forested landuses in this watershed create ideal habitat for wildlife. Wildlife would contribute during all flow conditions with possible spikes in *E. coli* levels during extreme high flow conditions due to runoff or flooding which carries large quantities of *E. coli* at one time. There are several species no longer abundant in Sugar Creek (Merchant, 2006 Personal Communication).

There is a lack of *E. coli* sampling for several tributaries. It is unclear as to the magnitude that these tributaries contribute to the *E. coli* impairment.

Six (6) of the NPDES permitted facilities in this watershed contain a sanitary component in their discharge. Since there are no open enforcement cases against these facilities, they are not considered major contributors of *E. coli*.

CFOs could be sources of *E. coli* during high flow conditions on the water quality duration curve. These facilities have the potential to cause a violation of the *E. coli* water quality standard through land application or a malfunction at the facility. There are no open enforcement cases against any of these facilities; therefore, these facilities are not considered major sources of *E. coli*.

Failing septic systems are a known source of *E. coli* for this watershed based on information provided to IDEM by the Hancock, Henry, Johnson, Madison, and Shelby County Health Departments (Clidence, Pease, Pursley, Schmidt, and Smith, 2005 Personal Communication). The septic systems described by this information would provide a constant source of *E. coli* particularly during low to mid-range flow conditions. According to the water quality duration curve, there are consistent violations of the *E. coli* water quality standard during these flow conditions. Septic systems can also fail during higher flow conditions by leaching to a field tile or other type of pipe that discharges to the stream.

There are zero (0) CSO discharge points in the Sugar Creek watershed.

Linkage Conclusions

The *E. coli* data has an average single sample maximum violation 38.75 % of the time and a geometric mean violation 33.33% of the time. There are no known NPDES permits, CFO, or CAFO violations in the Sugar Creek watershed. Based on the water quality duration curves, it can be concluded that the majority of sources of *E. coli* in this watershed are nonpoint sources based on the time of the sampling events; however, since the highest violations occur during the highest flow events, nonpoint sources are also a large contributor to in the impairment in Sugar Creek. The sampling occurred during the dry season; therefore, the violations that occurred in the Sugar Creek watershed all appear to be in the low flow range. There are reported problems with stagnant water in low flow conditions (Bitner, 2006 Personal Communication). Violations that occur during the low flow range likely come from straight pipe discharges (WLA = 0) from septic systems, cattle, and other wildlife having access to the stream. Erosion is also reported along Sugar Creek (Elsbury, 2006 Personal Communication). However, the abundance of nonpoint sources in this watershed indicates that nonpoint sources contribute to the *E. coli* in Sugar Creek. Nonpoint source contribution of *E. coli* to the stream is supported by the highest violations being correlated with the highest flow during the sampling period. Nonpoint sources include small animal operations, wildlife, and leaking and failing septic systems.

TMDL Development

The TMDL represents the maximum loading that can be assimilated by the waterbody while still achieving the water quality standard (WQS). As indicated in the Numeric Targets section of this document, the target for this *E. coli* TMDL is 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1 through October 31. Concurrent with the selection of a numeric concentration endpoint, TMDL development also defines the critical conditions that will be used when defining allowable levels. Many TMDLs are designed as the set of environmental conditions that, when addressed by appropriate controls, will ensure attainment of WQS for the pollutant. For example, the critical conditions for the control of point sources in Indiana are given in 327 IAC 5-2-11.1(b). In general, the 7-day average low flow in 10 years (Q7, 10) for a stream is used as the design condition for point source dischargers. However, *E. coli* sources to the Sugar Creek watershed arise from a mixture of dry and wet weather-driven conditions, and there is no single critical condition that would achieve the *E. coli* WQS. For the Sugar Creek watershed and the contributing sources, there are a number of different allowable loads that will ensure compliance, as long as they are distributed properly throughout the watershed.

For most pollutants, TMDLs are expressed on a mass loading basis (e.g. pounds per day). For *E. coli* indicators, however, mass is not an appropriate measure because *E. coli* is expressed in terms of organism counts (or resulting concentration) (USEPA, 2001). Meeting the Water Quality Standards (WQS) of 125 colony forming unit (cfu) per 100 mL as a geometric mean and 235 cfu/100 mL is the overall goal of the TMDL. The geometric mean *E. coli* WQS allows for the best characterization of the watershed. The geometric mean provides a more reliable measure of *E. coli* concentration because it is less subject to random variation (USEPA, 2004). However, by setting the target to meet the 125 cfu/100 mL geometric mean standard, this TMDL also will meet the 235 cfu/100 mL single day standard. Therefore, this *E. coli* TMDL is concentration-based consistent with 327 IAC 5-2-11.1(b) and 40 CFR, Section 130.2 (i) and the TMDL is equal to the geometric mean *E. coli* WQS for each month of the recreational season (April 1 through October 31).

The Wasteload Allocation and Load Allocations in the TMDL are set at 125 cfu/mL, which as stated above, also will meet the 235 cfu/100 mL single day standard.

Allocations

TMDLs are comprised of the sum of individual wasteload allocations (WLA) for point sources and load allocations (LA) for nonpoint sources and natural background levels. In addition, the TMDL must include a Margin of Safety (MOS), either implicitly or explicitly, that accounts for uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this definition is denoted by the equation:

$$\text{TMDL} = \sum \text{WLA} + \sum \text{LA} + \text{MOS}$$

The term TMDL represents the maximum loading that can be assimilated by the receiving water while still achieving WQS. The overall loading capacity is subsequently allocated into the TMDL components of WLAs for point sources, LAs for nonpoint sources, and the MOS. This *E. coli* TMDL is concentration-based consistent with USEPA regulations at 40 CFR, Section 130.2 (i).

Wasteload Allocations

As previously mentioned, there are nine (9) permitted dischargers in the Sugar Creek watershed. Six (6) of the nine (9) permitted dischargers have a sanitary component to their discharge. Three (3) of these six (6) permitted dischargers already have *E. coli* limits in their permits. The remaining 3 (three) of these six (6) permitted dischargers have total residual chlorine (TRC) limits in their permits. IDEM’s TMDL program recommends the addition of *E. coli* limits to these three (3) permits with TRC limits during the next permit renewal.

There are five (5) MS4 communities, Hancock County (INR040128), Johnson County (INR040045), Madison County (INR040111), New Palestine (INR040070), and Edinburgh (INR040026), in the Sugar Creek watershed. To date, these permits have not been issued for any of these MS4 communities. Guidelines for MS4 permits and timelines are outlined in Indiana’s Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11).

There are zero (0) CSO community(s) in the Sugar Creek Watershed.

The WLA is set at the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1 through October 31. The WLA for straight pipe discharges is set to 0 per one hundred milliliters.

Load Allocations

The LA for nonpoint sources is equal to the WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty-day period from April 1 through October 31. The LA will use the geometric mean of each sampling location to determine the reduction necessary to comply with WQS at each site (Attachment D).

Load allocations may be affected by subsequent work in the watershed. The Hancock County Soil & Water Conservation District has applied for 319 funding to create a watershed management plan for Sugar Creek in Hancock County (Beckner, 2005 Personal Communication). It is anticipated that additional watershed projects will be useful in defining the nonpoint sources of *E. coli* in the Sugar Creek watershed.

Margin of Safety

A Margin of Safety (MOS) was incorporated into this TMDL analysis. The MOS accounts for any uncertainty or lack of knowledge concerning the relationship between pollutant loading and water quality. The MOS can be either implicit (i.e., incorporated into TMDL analysis thorough conservative assumptions) or explicit (i.e., expressed in the TMDL as a portion of the loadings). This TMDL uses an implicit MOS by applying a couple of conservative assumptions. First, no rate of decay for *E. coli* was applied. *E. coli* bacteria have a limited capability of surviving outside of their hosts; therefore, a rate of decay normally would be applied. However, applying a rate of decay could result in a discharge limit that would be greater than the *E. coli* WQS, thus no rate of decay was applied. Second, the *E. coli* WQS was applied to all flow conditions. This adds to the MOS for this TMDL. IDEM determined that applying the *E. coli* WQS of 125 per one hundred milliliters to all flow conditions and with no rate of decay for *E. coli* is a more conservative approach that provides for greater protection of the water quality.

Seasonality

Seasonality in the TMDL is addressed by expressing the TMDL in terms of the *E. coli* WQS for total body contact during the recreational season (April 1 through October 31) as defined by 327 IAC 2-1-6(d). There is no applicable total body contact *E. coli* WQS during the remainder of the year in Indiana. Because this is a concentration-based TMDL, *E. coli* WQS will be met regardless of flow conditions in the applicable season.

Monitoring

Future *E. coli* monitoring of the Sugar Creek watershed will take place during IDEM's five-year rotating basin schedule and/or once TMDL implementation methods are in place. Monitoring will be adjusted as needed to assist in continued source identification and elimination. IDEM will monitor at an appropriate frequency to determine whether Indiana's 30-day geometric mean value of 125 per one hundred milliliters is being met. When these results indicate that the waterbody is meeting the *E. coli* WQS, the waterbody will then be removed from the 303(d) list.

Reasonable Assurance Activities

Reasonable assurance activities are programs that are in place or will be in place to assist in meeting the Sugar Creek watershed TMDL allocations and the *E. coli* Water Quality Standard (WQS).

<u>National Pollutant Discharge Elimination System (NPDES) Permitted Dischargers</u>

For the permitted dischargers that have only total residual chlorine limits in their current permits, IDEM's TMDL program proposes that *E. coli* limits and monitoring be added when the next permit renewals are issued.

<u>Storm Water General Permit Rule 13</u>

MS4 permits are being issued in the state of Indiana. The five (5) MS4 communities in the Sugar Creek watershed are Hancock County, Johnson County, Madison County, New Palestine, and Edinburgh. Once these permits have been issued and implemented, they will improve the water quality in the Sugar Creek watershed. Guidelines for MS4 permits and timelines are outlined in Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 (327 IAC 15-13-10 and 327 IAC 15-13-11). These permits will be used to address storm water impacts in the Sugar Creek watershed.

<u>Regional Sewer District (RSD)</u>

A Regional Sewer District has been established for Hancock County. This sewer district deals with both wastewater and drinking water and is county-wide.

<u>Confined Feeding Operations and Concentrated Animal Feeding Operations</u>

CFO and CAFO are required to manage manure, litter, and process wastewater pollutants in a manner that does not cause or contribute to the impairment of *E. coli* WQS.

<u>Watershed Projects</u>

The Hancock County Soil & Water Conservation District has applied for 319 funding to begin a watershed management plan for Sugar Creek in Hancock County (Cindy Beckner, 2005 Personal Communication).

The Youngs Creek watershed has a watershed group working on implementing a watershed management plan. The Youngs Creek watershed is west of Sugar Creek and Youngs Creek flows southeast to join Sugar Creek in southeastern Johnson County (Robertson, 2005 Personal Communication).

Studies examining water movement and the transport of nutrients and pesticides via tile drains are being conducted within the Leary Weber Ditch watershed, which is part of the Sugar Creek watershed (Lathrop 2006; Stone, 2006; and Sui 2006).

IDEM has recently hired a Watershed Specialist for this area of the state. The Watershed Specialist will be available to assist stakeholders with starting a watershed group, facilitating planning activities, and serving as a liaison between watershed planning and TMDL activities in the Sugar Creek watershed.

Recycling

Hancock and Johnson Counties have well-developed programs for promoting recycling activities among residents. These programs include hazardous waste, tire, electronics, oil, battery, and antifreeze collection days, as well as educational outreach (Wampler, Antell, 2005 Personal Communication). The Greenfield Wastewater Treatment facility operates a compost that is open to all residents of Greenfield (Wampler, 2005 Personal Communication).

TMDL Reports

There are no additional TMDLs assigned to be completed within the Sugar Creek watershed at this time; however, there is a TMDL being completed in a watershed to the east, Big Blue River, in Henry and Rush Counties. The Big Blue River flows southwest to join Sugar Creek in the southeastern corner of Johnson County.

Potential Future Activities

Nonpoint source pollution, which contributes to the *E. coli* impairment in this watershed, can be reduced by the implementation of "best management practices" (BMPs). BMPs are practices used in agriculture, forestry, urban land development, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Livestock owners, farmers, and urban planners can implement BMPs outside of a watershed management plan, but the success of BMPs would be enhanced if coordinated as part of a watershed management plan. Following are examples of BMPs that may be used to reduce *E. coli* runoff:

Riparian Area Management - Management of riparian areas protects stream banks and river banks with a buffer zone of vegetation of grasses, legumes, or trees.

Manure Collection and Storage - Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run off into surface waters or leach down into groundwater.

Contour Row Crops - Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.

No-Till Farming - No-till is a year-round conservation farming system. In its pure form, no-till does not include any tillage operations either before or after planting. The practice reduces wind and water erosion, catches snow, conserves soil and water, protects water quality, and provides wildlife habitat. No-till helps control soil erosion and improve water quality by maintaining maximum residue plant levels on the soil surface. These plant residues: 1) protect soil particles and applied nutrients and pesticides from detachment by wind and water; 2) increase infiltration; and 3) reduce the speed at which wind and water move over the soil surface.

Manure Nutrient-Testing - If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid overapplication and run-off.

Drift Fences - Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keeps animals out and prevents direct input of *E. coli* to the stream.

Pet Clean-up/Education - Education programs for pet owners can improve water quality of runoff from urban areas.

Septic Management/Public Education - Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some anthropogenic sources of *E. coli*.

Conclusion

The sources of *E. coli* to the Sugar Creek watershed include both point and nonpoint sources. In order for the Sugar Creek watershed to achieve Indiana's *E. coli* WQS, the wasteload and load allocations for the Sugar Creek watershed in Indiana have been set to the *E. coli* WQS of 125 per one hundred milliliters as a geometric mean based on not less than five samples equally spaced over a thirty day from April 1 through October 31. Achieving the wasteload and load allocations for the Sugar Creek watershed depends on:

1) *E. coli* limits being added to dischargers who monitor for total residual chlorine.
2) CFOs not violating their permits.
3) Nonpoint sources of *E. coli* being controlled by implementing best management practices in the watershed.
4) The issuance of the MS4 permits for Hancock County, Johnson County, Madison County, New Palestine, and Edinburgh.
5) Education and outreach for septic system care.

The next phase of this TMDL is to identify and support the implementation of activities that will bring the Sugar Creek watershed in compliance with the *E. coli* WQS. IDEM will continue to work with its existing programs on implementation. In the event that designated uses and associated water quality criteria applicable to the Sugar Creek watershed are revised in accordance with applicable requirements of state and federal law, the TMDL implementation activities may be revised to be consistent with such revisions. Additionally, IDEM will work with local stakeholder groups to pursue best management practices that will result in the improvement of water quality in the Sugar Creek watershed.

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Table 1: NPDES Permits in the Sugar Creek Watershed

Facilities with *E. coli* Limits

Permit No.	Expiration Date	Facility Name	Receiving Waters
IN0025437	3/31/2010	Act II Estates	Eastes Ditch to Sugar Creek
IN0057959	2/28/2010	Arrowhead Mobile Home Park	Sugar Creek
IN0049689	9/30/2006	Eden Elementary School	Barret Ditch to Sugar Creek

Facilities with Total Residual Chlorine Limits

Permit No.	Expiration Date	Facility Name	Receiving Waters
IN0036528	6/30/2006	Sugar Creek Utility Company	Sugar Creek
IN0038431	7/31/2008	Creekside Mobile Home Park	Sugar Creek
IN0042358	10/31/2006	New Palestine Municipal STP	Sugar Creek

Facilities with no Sanitary Component

Permit No.	Expiration Date	Facility Name	Receiving Waters
IN0059307	5/31/2007	Franklin Plant – IAWC	Sugar Creek
IN0003409	4/30/2006	Sonoco Flexible Packaging	Sugar Creek
IN0060747	10/31/2010	Shelby Petroleum, Inc	Potts Ditch

Table 2: Permitted Confined Feeding Operations in the Sugar Creek Watershed

			Approved Animals				
Log Number	Name	NPDES Permit Number	Nursery Pig	Growerfinishers	Sowboars	Beef	Turkeys
1138	Lantz	N/A	900	1747	484	0	0
4204	Lawyer	N/A	500	800	0	0	0
3590	McFarland Dairy	N/A	0	0	0	426	0
735	Welty Farms # 1	N/A	880	1500	500	0	0
176	Welty Farms # 2	N/A	0	1600	0	0	0
4975	Wilson	N/A	0	0	700	0	0

Figure 1: Sugar Creek Watershed

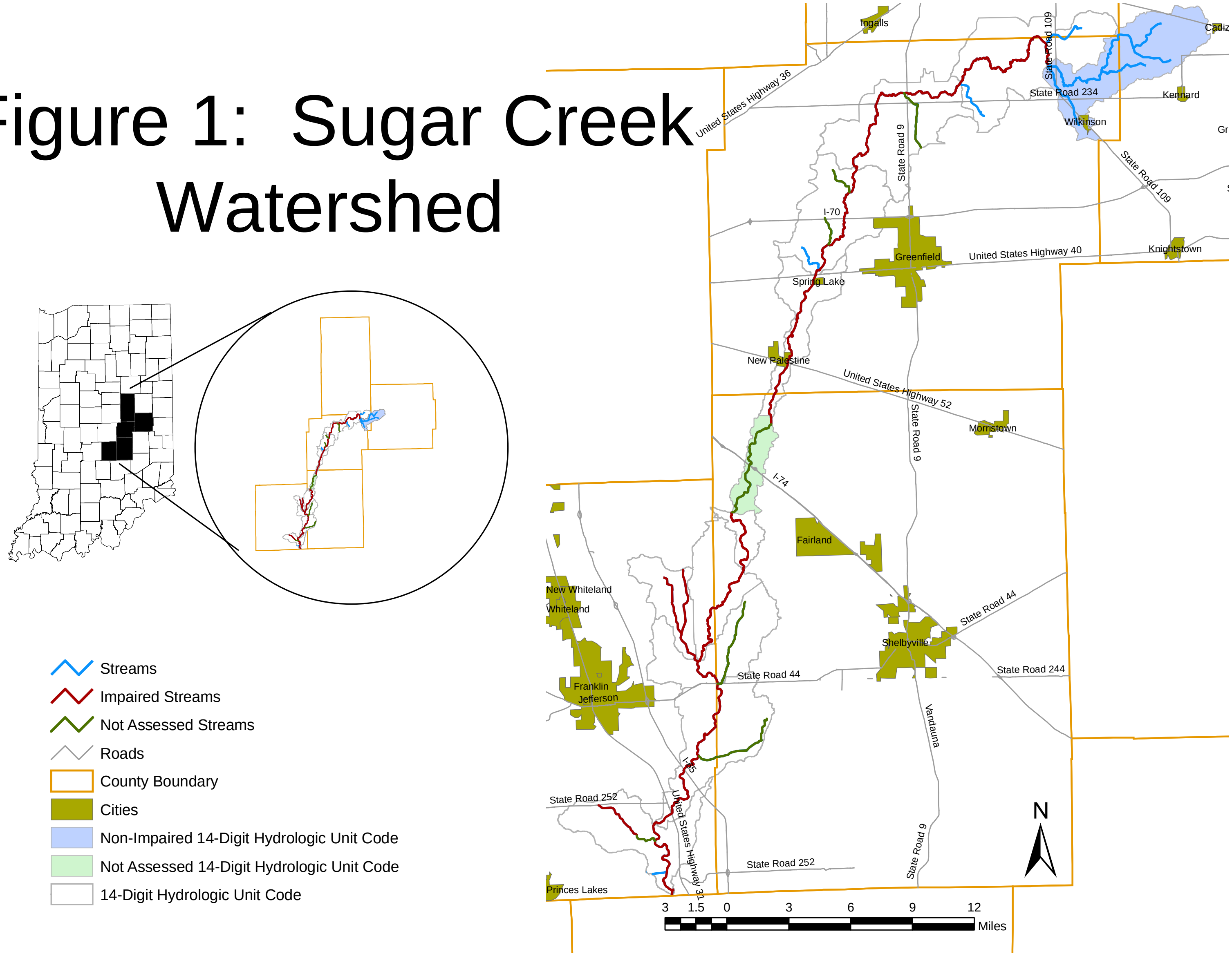


Figure 2: Sample Sites

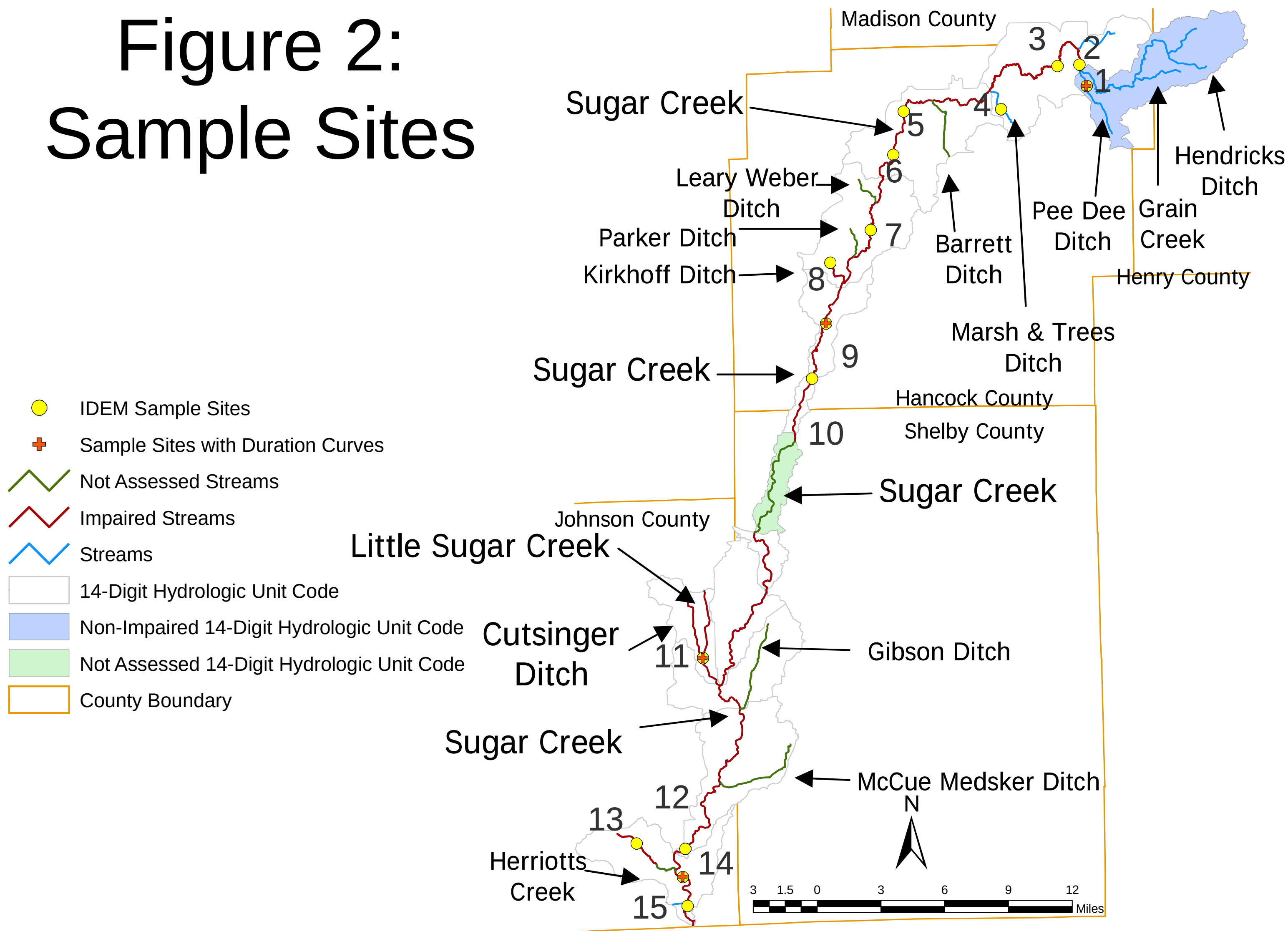


Figure 3: Sugar Creek Landuse

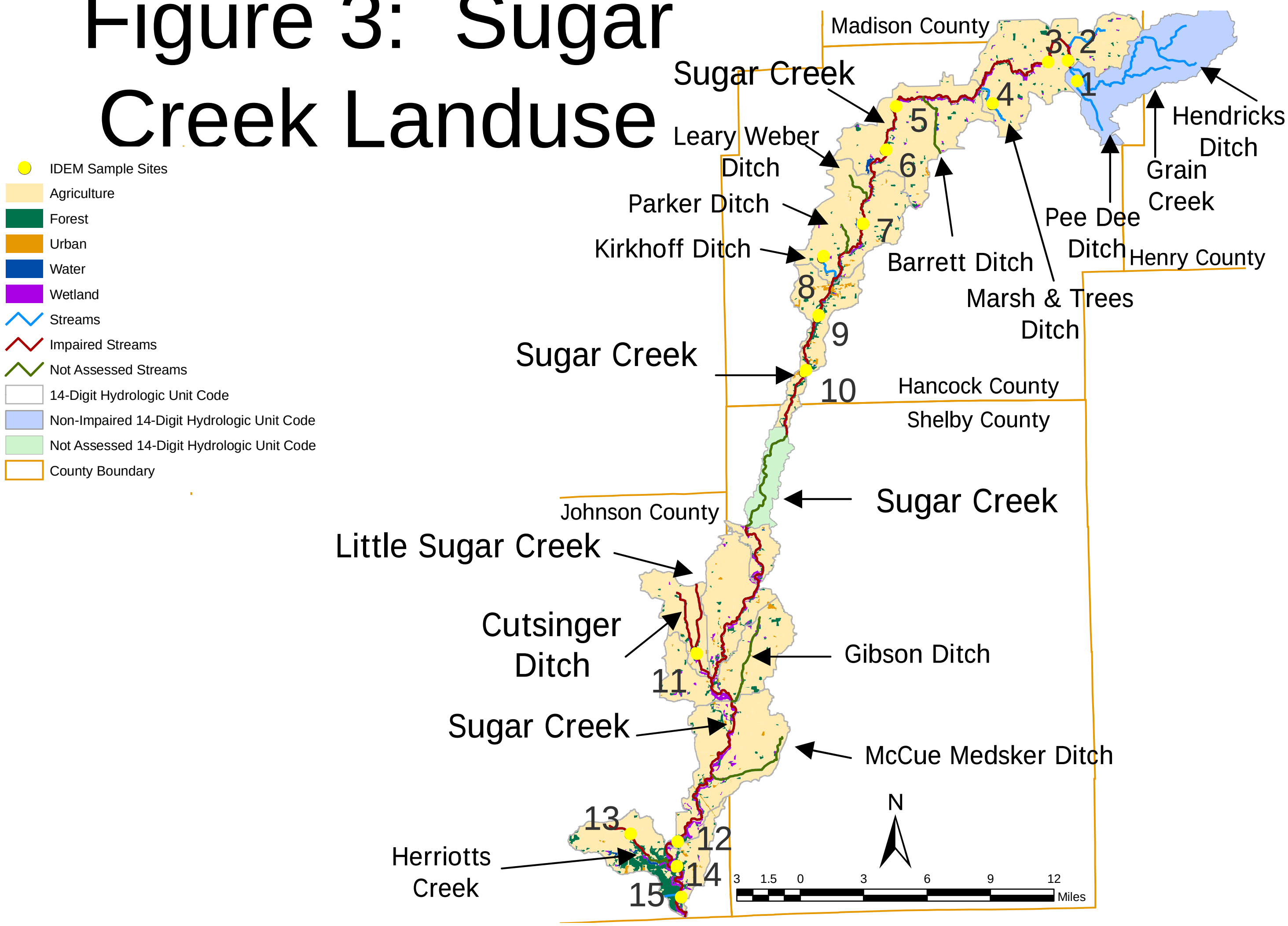
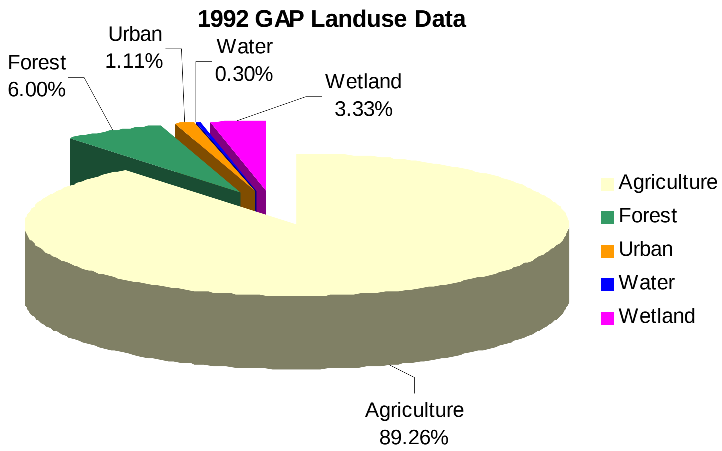


Figure 4: Landuse Comparison



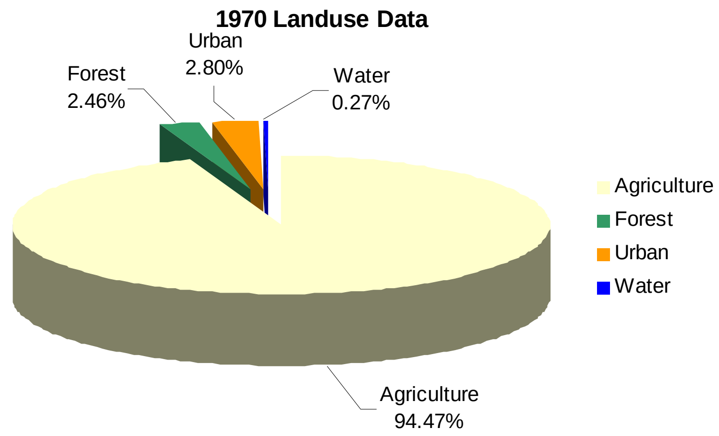


Figure 5: NPDES Permitted Facilities

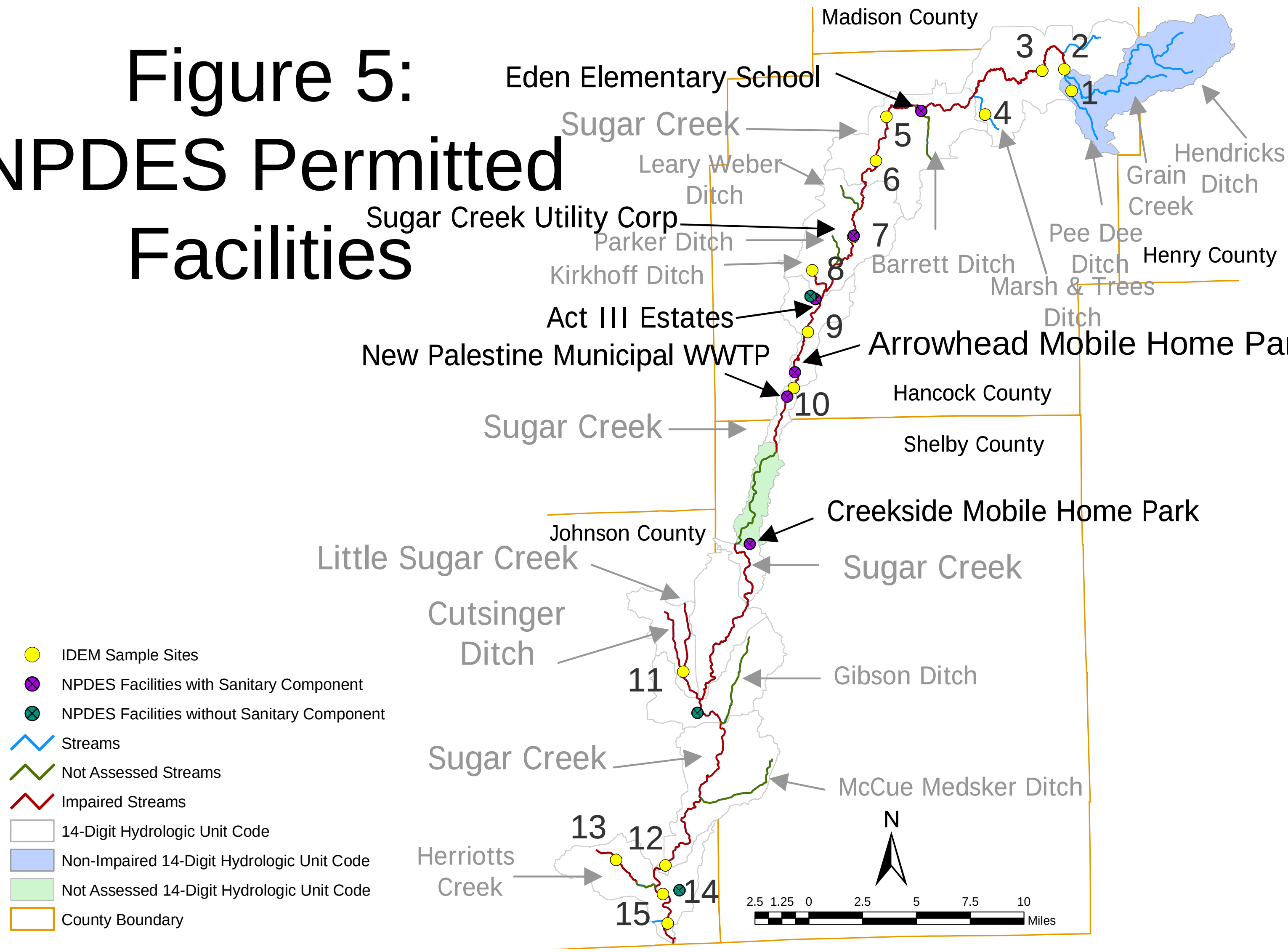
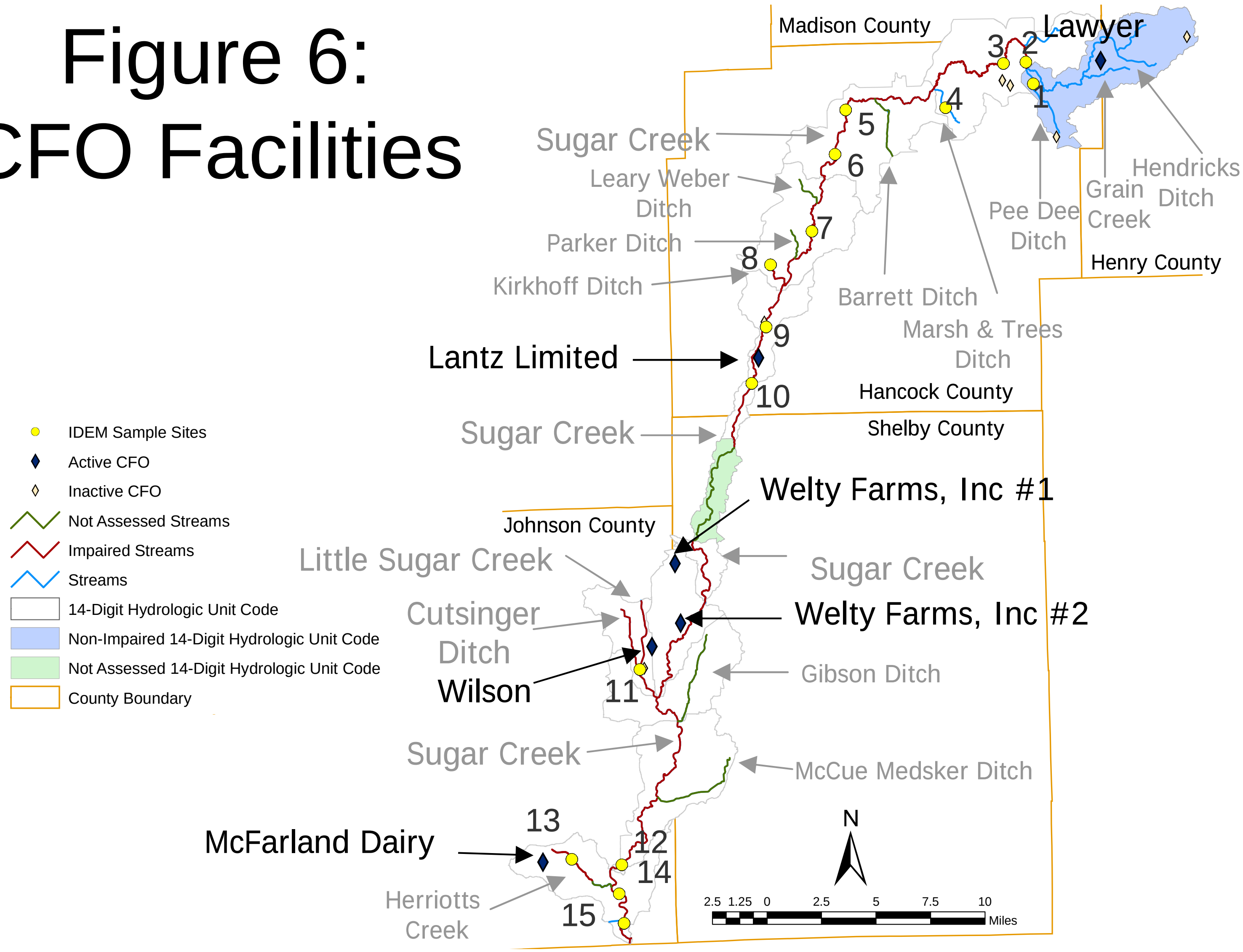


Figure 6: CFO Facilities



Attachment A

E. coli Data for the Sugar Creek Watershed TMDL

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Site Number	Project Name	Stream Name	Description	LSITE	County	Sample Date	Sample Number	E. coli (CFU/100 mL)	E. coli (MPN/100 mL)	Geometric Mean
1	2002 Sugar Creek E.coli	Pee Dee Ditch	CR 900 N	WED060-0011	Hancock	9/18/2002 0:00	AA13661		1553.07	
						9/26/2002 0:00	AA13726		38.8	
						10/2/2002 0:00	AA13997		72.3	
						10/9/2002 0:00	AA14010		29.5	
						10/16/2002 0:00	AA14025		59.8	94.87
2	2002 Sugar Creek E.coli	Sugar Cr	CR 1000 N	WED060-0009	Hancock	9/18/2002 0:00	AA13658		131.7	
						9/26/2002 0:00	AA13723		185	
						9/26/2002 0:00	AA13735 (D)		185	
						10/2/2002 0:00	AA13994		80.1	
						10/9/2002 0:00	AA14007		35.9	
						10/16/2002 0:00	AA14022		26.5	71.41
3	2002 Sugar Creek E.coli	Sugar Cr	N. Nashville Rd.	WED060-0012	Hancock	9/18/2002 0:00	AA13662		42.8	
						9/26/2002 0:00	AA13727		103.9	
						10/2/2002 0:00	AA13998		67.7	
						10/9/2002 0:00	AA14011		21.1	
						10/16/2002 0:00	AA14026		26.6	44.21
4	2002 Sugar Creek E.coli	Marsh and Trees Ditch	SR 234	WED060-0013	Hancock	9/18/2002 0:00	AA13663		137.4	
						9/18/2002 0:00	AA13670 (D)		107.6	
						9/26/2002 0:00	AA13728		10.8	
						10/2/2002 0:00	AA13999		25	
						10/9/2002 0:00	AA14012		20.1	
						10/16/2002 0:00	AA14027		10.8	30.88
5	2002 Sugar Creek E.coli	Sugar Cr	SR 234	WED060-0014	Hancock	9/18/2002 0:00	AA13664		131.7	
						9/26/2002 0:00	AA13729		155.3	
						10/2/2002 0:00	AA14000		488.4	
						10/2/2002 0:00	AA14001		517.2	
						10/9/2002 0:00	AA14013		127.4	
						10/16/2002 0:00	AA14028		146	214.02
6	2002 Sugar Creek E.coli	Sugar Cr	CR 600 N	WED060-0018	Hancock	9/18/2002 0:00	AA13665		344.8	
						9/26/2002 0:00	AA13730		365.4	
						10/2/2002 0:00	AA14002		93.3	
						10/9/2002 0:00	AA14014		65.7	
						10/16/2002 0:00	AA14029		172.5	167.85
7	2002 Sugar Creek E.coli	Sugar Cr	U-70	WED060-0015	Hancock	9/18/2002 0:00	AA13666		137.6	
						9/26/2002 0:00	AA13731		167.4	
						10/2/2002 0:00	AA14003		2419.2	
						10/9/2002 0:00	AA14015		1553.07	
						10/16/2002 0:00	AA14030		209.8	448.55
8	2002 Sugar Creek E.coli	Kirkhoff Ditch	CR 100 N	WED060-0016	Hancock	9/18/2002 0:00	AA13667		127.4	
						9/26/2002 0:00	AA13732		488.4	
						10/2/2002 0:00	AA14004		218.7	
						10/9/2002 0:00	AA14016		437.1	
						10/16/2002 0:00	AA14031		214.2	263.66
9	2002 Sugar Creek E.coli	Sugar Cr	CR 200 S	WED060-0017	Hancock	9/18/2002 0:00	AA13668		920.8	
						9/26/2002 0:00	AA13733		307.6	
						10/2/2002 0:00	AA14005		218.7	
						10/9/2002 0:00	AA14017		228.2	
						10/9/2002 0:00	AA14018 (D)		249.5	
						10/16/2002 0:00	AA14032		248.1	309.27
10	2002 Sugar Creek E.coli	Sugar Cr	US 52 at New Palestine	WED060-0002	Hancock	9/18/2002 0:00	AA13669		14.8	
						9/26/2002 0:00	AA13734		10.8	
						10/2/2002 0:00	AA14006		17.3	
						10/9/2002 0:00	AA14019		10.8	
						10/16/2002 0:00	AA14033		49.6	17.14
11	2002 E. coli Muscatatuck and Upper EF WR	Little Sugar Cr	CR 350N, W of CR 700E	WED080-0014	Johnson	9/9/2002 0:00	AA13645		2419	
						9/18/2002 0:00	AA13643		9804	
						9/25/2002 0:00	AA13718		4106	
						9/25/2002 0:00	AA13720		259	
						10/2/2002 0:00	AA13987		4352	
						10/9/2002 0:00	AA14082		1986.28	3846.25
12	2002 Youngs Cr TMDL Assessment	Sugar Cr	CR 550 E	WED080-0013	Johnson	7/2/2002 0:00	AA10898		730	
						7/9/2002 0:00	AA12205	370		
						7/16/2002 0:00	AA12298		390	
						7/23/2002 0:00	AA12408		580	
						7/30/2002 0:00	AA12443		280	443.24
13	2002 Youngs Cr TMDL Assessment	Herriotts Cr	Schoolhouse Rd	WED090-0027	Johnson	7/2/2002 0:00	AA10897		1	
						7/9/2002 0:00	AA12204	920		
						7/16/2002 0:00	AA12297		1100	
						7/23/2002 0:00	AA12407		2400	
						7/30/2002 0:00	AA12442		2100	347.95
14	2002 Youngs Cr TMDL Assessment	Sugar Cr	North St (DNR Schoolhouse Rd & North St)	WED090-0026	Johnson	7/2/2002 0:00	AA10896		820	
						7/9/2002 0:00	AA12203	99		
						7/16/2002 0:00	AA12296		86	
						7/23/2002 0:00	AA12406		500	
						7/30/2002 0:00	AA12441		140	217.68
15	2002 E. coli Muscatatuck and Upper EF WR	Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	WED090-0004	Johnson	9/9/2002 0:00	AA13572		126.7	
						9/16/2002 0:00	AA13596		68.3	
						9/23/2002 0:00	AA13671		307.8	
						9/30/2002 0:00	AA13940		133.3	
						10/7/2002 0:00	AA14035		90.7	126.35

Site Number	PROJECTNAM	PROJECTID	STREAMNAME	DESCRIPTIO	HUCTO14	FSITE	LSITE	CTYNAME	SAMPLEDATE	XSAMPLENUM	SAMPLENU	E_COLI_C	E_COLI_M	Geometric Mean
	1997 Synoptic	10	Sugar Cr	U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock	5/29/1997 0:00	DA10232	DA10232	3400		
	1997 Synoptic	10	Sugar Cr	U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock	7/10/1997 0:00	DA10343	DA10343	2200		
	1997 Synoptic	10	Sugar Cr	U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock	9/16/1997 0:00	DA10446	DA10446	240		
	2002 Sugar Creek E.coli	209	Sugar Cr	US 52 at New Palestine	5120204060050		WED060-0002	Hancock	9/18/2002 0:00	AA13669	AA13669		14.8	
	2002 Sugar Creek E.coli	209	Sugar Cr	US 52 at New Palestine	5120204060050		WED060-0002	Hancock	9/26/2002 0:00	AA13734	AA13734		10.8	
10	2002 Sugar Creek E.coli	209	Sugar Cr	US 52 at New Palestine	5120204060050		WED060-0002	Hancock	10/2/2002 0:00	AA14006	AA14006		17.3	
	2002 Sugar Creek E.coli	209	Sugar Cr	US 52 at New Palestine	5120204060050		WED060-0002	Hancock	10/9/2002 0:00	AA14019	AA14019		10.8	
	2002 Sugar Creek E.coli	209	Sugar Cr	US 52 at New Palestine	5120204060050		WED060-0002	Hancock	10/16/2002 0:00	AA14033	AA14033		49.6	17.14
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	9/18/2002 0:00	AA13658	AA13658		131.7	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	9/26/2002 0:00	AA13723	AA13723		185	
2	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	9/26/2002 0:00	AA13735 (D)	AA13735		185	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	10/2/2002 0:00	AA13994	AA13994		80.1	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	10/9/2002 0:00	AA14007	AA14007		35.9	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 1000 N	5120204060020		WED060-0009	Hancock	10/16/2002 0:00	AA14022	AA14022		26.5	83.08
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 109	5120204060010		WED060-0010	Hancock	9/26/2002 0:00	AA13725	AA13725		613.1	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 109	5120204060010		WED060-0010	Hancock	10/2/2002 0:00	AA13996	AA13996		410.6	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 109	5120204060010		WED060-0010	Hancock	10/9/2002 0:00	AA14009	AA14009		770.1	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 109	5120204060010		WED060-0010	Hancock	10/16/2002 0:00	AA14024	AA14024		579.4	
	2002 Sugar Creek E.coli	209	Pee Dee Ditch	CR 900 N	5120204060010		WED060-0011	Hancock	9/18/2002 0:00	AA13661	AA13661		1553.07	
	2002 Sugar Creek E.coli	209	Pee Dee Ditch	CR 900 N	5120204060010		WED060-0011	Hancock	9/26/2002 0:00	AA13726	AA13726		38.8	
1	2002 Sugar Creek E.coli	209	Pee Dee Ditch	CR 900 N	5120204060010		WED060-0011	Hancock	10/2/2002 0:00	AA13997	AA13997		72.3	
	2002 Sugar Creek E.coli	209	Pee Dee Ditch	CR 900 N	5120204060010		WED060-0011	Hancock	10/9/2002 0:00	AA14010	AA14010		29.5	
	2002 Sugar Creek E.coli	209	Pee Dee Ditch	CR 900 N	5120204060010		WED060-0011	Hancock	10/16/2002 0:00	AA14025	AA14025		59.8	94.87
	2002 Sugar Creek E.coli	209	Sugar Cr	N. Nashville Rd.	5120204060020		WED060-0012	Hancock	9/18/2002 0:00	AA13662	AA13662		42.8	
	2002 Sugar Creek E.coli	209	Sugar Cr	N. Nashville Rd.	5120204060020		WED060-0012	Hancock	9/26/2002 0:00	AA13727	AA13727		103.9	
3	2002 Sugar Creek E.coli	209	Sugar Cr	N. Nashville Rd.	5120204060020		WED060-0012	Hancock	10/2/2002 0:00	AA13998	AA13998		67.7	
	2002 Sugar Creek E.coli	209	Sugar Cr	N. Nashville Rd.	5120204060020		WED060-0012	Hancock	10/9/2002 0:00	AA14011	AA14011		21.1	
	2002 Sugar Creek E.coli	209	Sugar Cr	N. Nashville Rd.	5120204060020		WED060-0012	Hancock	10/16/2002 0:00	AA14026	AA14026		26.6	44.21
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	9/18/2002 0:00	AA13663	AA13663		137.4	
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	9/18/2002 0:00	AA13670 (D)	AA13670		107.6	
4	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	9/26/2002 0:00	AA13728	AA13728		10.8	
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	10/2/2002 0:00	AA13999	AA13999		25	
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	10/9/2002 0:00	AA14012	AA14012		20.1	
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch	SR 234	5120204060020		WED060-0013	Hancock	10/16/2002 0:00	AA14027	AA14027		10.8	30.88
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	9/18/2002 0:00	AA13664	AA13664		131.7	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	9/26/2002 0:00	AA13729	AA13729		155.3	
5	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	10/2/2002 0:00	AA14000	AA14000		488.4	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	10/2/2002 0:00	AA14001	AA14001		517.2	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	10/9/2002 0:00	AA14013	AA14013		127.4	
	2002 Sugar Creek E.coli	209	Sugar Cr	SR 234	5120204060030		WED060-0014	Hancock	10/16/2002 0:00	AA14028	AA14028		146	214.02
	2002 Sugar Creek E.coli	209	Sugar Cr	U-70	5120204060040		WED060-0015	Hancock	9/18/2002 0:00	AA13666	AA13666		137.6	
	2002 Sugar Creek E.coli	209	Sugar Cr	U-70	5120204060040		WED060-0015	Hancock	9/26/2002 0:00	AA13731	AA13731		167.4	
7	2002 Sugar Creek E.coli	209	Sugar Cr	U-70	5120204060040		WED060-0015	Hancock	10/2/2002 0:00	AA14003	AA14003		2419.2	
	2002 Sugar Creek E.coli	209	Sugar Cr	U-70	5120204060040		WED060-0015	Hancock	10/9/2002 0:00	AA14015	AA14015		1553.07	
	2002 Sugar Creek E.coli	209	Sugar Cr	U-70	5120204060040		WED060-0015	Hancock	10/16/2002 0:00	AA14030	AA14030		209.8	448.55
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch	CR 100 N	5120204060040		WED060-0016	Hancock	9/18/2002 0:00	AA13667	AA13667		127.4	
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch	CR 100 N	5120204060040		WED060-0016	Hancock	9/26/2002 0:00	AA13732	AA13732		488.4	
8	2002 Sugar Creek E.coli	209	Kirkhoff Ditch	CR 100 N	5120204060040		WED060-0016	Hancock	10/2/2002 0:00	AA14004	AA14004		218.7	
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch	CR 100 N	5120204060040		WED060-0016	Hancock	10/9/2002 0:00	AA14016	AA14016		437.1	
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch	CR 100 N	5120204060040		WED060-0016	Hancock	10/16/2002 0:00	AA14031	AA14031		214.2	263.66
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	9/18/2002 0:00	AA13668	AA13668		920.8	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	9/26/2002 0:00	AA13733	AA13733		307.6	
9	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	10/2/2002 0:00	AA14005	AA14005		218.7	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	10/9/2002 0:00	AA14017	AA14017		228.2	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	10/9/2002 0:00	AA14018 (D)	AA14018		249.5	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 200 S	5120204060050		WED060-0017	Hancock	10/16/2002 0:00	AA14032	AA14032		248.1	309.27
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 600 N	5120204060030		WED060-0018	Hancock	9/18/2002 0:00	AA13665	AA13665		344.8	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 600 N	5120204060030		WED060-0018	Hancock	9/26/2002 0:00	AA13730	AA13730		365.4	
6	2002 Sugar Creek E.coli	209	Sugar Cr	CR 600 N	5120204060030		WED060-0018	Hancock	10/2/2002 0:00	AA14002	AA14002		93.3	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 600 N	5120204060030		WED060-0018	Hancock	10/9/2002 0:00	AA14014	AA14014		65.7	
	2002 Sugar Creek E.coli	209	Sugar Cr	CR 600 N	5120204060030		WED060-0018	Hancock	10/16/2002 0:00	AA14029	AA14029		172.5	167.85
	1997 Synoptic	10	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	5/29/1997 0:00	DA10234	DA10234	450		
	1997 Synoptic	10	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	7/10/1997 0:00	DA10345	DA10345	800		
	1997 Synoptic	10	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	9/16/1997 0:00	DA10448	DA10448	220		
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	9/9/2002 0:00	AA13578	AA13578		131.7	
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	9/18/2002 0:00	AA13644	AA13644		152.9	
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	9/25/2002 0:00	AA13719	AA13719		298.7	
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	9/25/2002 0:00	AA13722 (D)	AA13722		365.4	
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	10/2/2002 0:00	AA13988	AA13988		198.9	
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr	CR 275 N	5120204080050		WED080-0001	Shelby	10/9/2002 0:00	AA14083	AA14083		143.9	
	1997 Synoptic	10	Little Sugar Cr	CR 700 E	5120204080080		WED080-0002	Johnson	5/29/1997 0:00	DA10235	DA10235	3400		
	1997 Synoptic	10	Little Sugar Cr	CR 700 E	5120204080080		WED080-0002	Johnson	7/10/1997 0:00	DA10346	DA10346	2400		
	1997 Synoptic	10	Little Sugar Cr	CR 700 E	5120204080080		WED080-0002	Johnson	9/16/1997 0:00	DA10449	DA10449	430		

	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	CR 550 E	5120204080100	WED080-0013	Johnson	7/2/2002 0:00	AA10898	AA10898		730	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	CR 550 E	5120204080100	WED080-0013	Johnson	7/9/2002 0:00	AA12205	AA12205	370		
12	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	CR 550 E	5120204080100	WED080-0013	Johnson	7/16/2002 0:00	AA12298	AA12298		390	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	CR 550 E	5120204080100	WED080-0013	Johnson	7/23/2002 0:00	AA12408	AA12408		580	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	CR 550 E	5120204080100	WED080-0013	Johnson	7/30/2002 0:00	AA12443	AA12443		280	443.24
	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	9/9/2002 0:00	AA13645	AA13645		2419	
	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	9/18/2002 0:00	AA13643	AA13643		9804	
11	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	9/25/2002 0:00	AA13718	AA13718		4106	
	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	9/25/2002 0:00	AA13720	AA13720		259	
	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	10/2/2002 0:00	AA13987	AA13987		4352	
	2002 E. coli Muscatatuck and Upper EF WR	202 Little Sugar Cr	CR 350N, W of CR 700E	5120204080080	WED080-0014	Johnson	10/9/2002 0:00	AA14082	AA14082		1986.28	3846.25
	1991 Fixed Station	2 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	7/1/1991 0:00	DI9189	DI9189	20		
	1991 Fixed Station	2 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/30/1991 0:00	DI9501	DI9501	130		
	1991 Fixed Station	2 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/3/1991 0:00	DI9814	DI9814	380		
	1992 Fixed Station	59 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	4/6/1992 0:00	DI12081	DI12081	20		
	1992 Fixed Station	59 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	10/30/1992 0:00	DI13430	DI13430	100		
	1992 Fixed Station	59 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	11/30/1992 0:00	DI13561	DI13561	310		
	1993 Fixed Station	60 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	2/3/1993 0:00	DI13920	DI13920	120		
	1993 Fixed Station	60 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/24/1993 0:00	DI14407	DI14407	20		
	1994 Fixed Station	61 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	11/1/1994 0:00	DI17607	DI17607	260		
	1995 Fixed Station	6 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	4/10/1995 0:00	DI18755	DI18755	30		
	1995 Fixed Station	6 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	7/17/1995 0:00	DI19410	DI19410	700		
	1995 Fixed Station	6 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	11/1/1995 0:00	DI20322	DI20322	< 10		
	1995 Fixed Station	6 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/5/1995 0:00	DI20626	DI20626	20		
	1996 Fixed Station	7 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	1/17/1996 0:00	DI20734	DI20734	350		
	1996 Fixed Station	7 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/29/1996 0:00	DI21246	DI21246	7900		
	1996 Fixed Station	7 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	7/25/1996 0:00	DI22004	DI22004	380		
	1996 Fixed Station	7 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	11/1/1996 0:00	DI22782	DI22782	30		
	1997 Fixed Station	8 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	1/30/1997 0:00	DI23210	DI23210	260		
	1997 Fixed Station	8 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/7/1997 0:00	DI23544	DI23544	30		
	1997 Fixed Station	8 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	8/29/1997 0:00	DI23879	DI23879	100		
	1997 Fixed Station	8 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/17/1997 0:00	DI24596	DI24596	< 10		
	1998 Fixed Station	1 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	2/12/1998 0:00	DI24840	DI24840	160 (H)		
	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/5/1999 0:00	DI27311	DI27311	120		
	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/5/1999 0:00	DI27328 (D)	DI27328	90		
	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/16/1999 0:00	DI27509	DI27509	266		
	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/16/1999 0:00	DI27526 (D)	DI27526	217		
	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/2/1999 0:00	DI28101	DI28101	10		
15	1999 Fixed Station	62 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/8/1999 0:00	DI28686	DI28686	325		
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	3/8/2000 0:00	DI29264	DI29264		19	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/6/2000 0:00	DI29837	DI29837		57	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	8/15/2000 0:00	DI30251	DI30251		47	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	8/15/2000 0:00	DI30260 (D)	DI30260		37	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	10/17/2000 0:00	DI30625	DI30625		820	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/5/2000 0:00	DI30994	DI30994		130	
	2000 Fixed Station	30 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	12/5/2000 0:00	DI31004 (D)	DI31004		110	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	2/6/2001 0:00	DI31377	DI31377		270	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	2/6/2001 0:00	DI31386 (D)	DI31386		150	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	4/17/2001 0:00	DI31790	DI31790		88	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/21/2001 0:00	DI32188	DI32188		490	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	8/2/2001 0:00	DI32587	DI32587		100	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	10/3/2001 0:00	DI32973	DI32973		64	
	2001 Fixed Station	105 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	10/3/2001 0:00	DI32984 (D)	DI32984		60	
	2002 Fixed Station	189 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/6/2002 0:00	AA11251	AA11251		1100	
	2002 E. coli Muscatatuck and Upper EF WR	202 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/9/2002 0:00	AA13572	AA13572		126.7	
	2002 E. coli Muscatatuck and Upper EF WR	202 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/16/2002 0:00	AA13596	AA13596		68.3	
	2002 E. coli Muscatatuck and Upper EF WR	202 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/23/2002 0:00	AA13671	AA13671		307.8	
	2002 E. coli Muscatatuck and Upper EF WR	202 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	9/30/2002 0:00	AA13940	AA13940		133.3	
	2002 E. coli Muscatatuck and Upper EF WR	202 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	10/7/2002 0:00	AA14035	AA14035		90.7	126.35
	2003 Fixed Station	257 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	4/15/2003 0:00	AA15536	AA15536		46	
	2003 Fixed Station	257 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	4/15/2003 0:00	AA15537 (D)	AA15537		50	
	2003 Fixed Station	257 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/3/2003 0:00	AA16499	AA16499		390	
	2003 Fixed Station	257 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	8/7/2003 0:00	AA18034	AA18034		73	
	2004 Fixed Station	513 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	5/6/2004 0:00	AA22565	AA22565		54	
	2004 Fixed Station	513 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	6/9/2004 0:00	AA23092	AA23092		200	
	2005 Fixed Station	776 Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080 SGR-1	WED090-0004	Johnson	3/10/2005 0:00	AA26093	AA26093		70	
	1997 Synoptic	10 Sugar Cr	Atterbury Rd	5120204090080	WED090-0006	Johnson	5/29/1997 0:00	DA10236	DA10236	370		
	1997 Synoptic	10 Sugar Cr	Atterbury Rd	5120204090080	WED090-0006	Johnson	7/10/1997 0:00	DA10347	DA10347	130		
	1997 Synoptic	10 Sugar Cr	Atterbury Rd	5120204090080	WED090-0006	Johnson	9/16/1997 0:00	DA10450	DA10450	30		
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	North St (DNR Schoolhouse Rd & North St)	5120204090080	WED090-0026	Johnson	7/2/2002 0:00	AA10896	AA10896		820	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	North St (DNR Schoolhouse Rd & North St)	5120204090080	WED090-0026	Johnson	7/9/2002 0:00	AA12203	AA12203	99		
14	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	North St (DNR Schoolhouse Rd & North St)	5120204090080	WED090-0026	Johnson	7/16/2002 0:00	AA12296	AA12296		86	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	North St (DNR Schoolhouse Rd & North St)	5120204090080	WED090-0026	Johnson	7/23/2002 0:00	AA12406	AA12406		500	
	2002 Youngs Cr TMDL Assessment	210 Sugar Cr	North St (DNR Schoolhouse Rd & North St)	5120204090080	WED090-0026	Johnson	7/30/2002 0:00	AA12441	AA12441		140	217.68
	2002 Youngs Cr TMDL Assessment	210 Herriotts Cr	Schoolhouse Rd	5120204090080	WED090-0027	Johnson	7/2/2002 0:00	AA10897	AA10897		1	
	2002 Youngs Cr TMDL Assessment	210 Herriotts Cr	Schoolhouse Rd	5120204090080	WED090-0027	Johnson	7/9/2002 0:00	AA12204	AA12204	920		
13	2002 Youngs Cr TMDL Assessment	210 Herriotts Cr	Schoolhouse Rd	5120204090080	WED090-0027	Johnson	7/16/2002 0:00	AA12297	AA12297		1100	
	2002 Youngs Cr TMDL Assessment	210 Herriotts Cr	Schoolhouse Rd	5120204090080	WED090-0027	Johnson	7/23/2002 0:00	AA12407	AA12407		2400	
	2002 Youngs Cr TMDL Assessment	210 Herriotts Cr	Schoolhouse Rd	5120204090080	WED090-0027	Johnson	7/30/2002 0:00	AA12442	AA12442		2100	347.95

Site ID	WaterShed Name	River Name	Description	Date	E-coli (colonies 100 mL)
100	Driftwood 05120204	Sugar Creek	Betty Thomas	7/11/2000	0
100	Driftwood 05120204	Sugar Creek	Betty Thomas	11/2/2000	4
618	Driftwood 05120204	Sugar Creek	West 400 South	4/5/2004	40
618	Driftwood 05120204	Sugar Creek	West 400 South	8/21/2004	
618	Driftwood 05120204	Sugar Creek	West 400 South	10/30/2004	
618	Driftwood 05120204	Sugar Creek	West 400 South	6/19/2005	
618	Driftwood 05120204	Sugar Creek	West 400 South	9/3/2005	
618	Driftwood 05120204	Sugar Creek	West 400 South	10/25/2005	

Attachment B

Water Quality Duration Curves for the Sugar Creek Watershed TMDL

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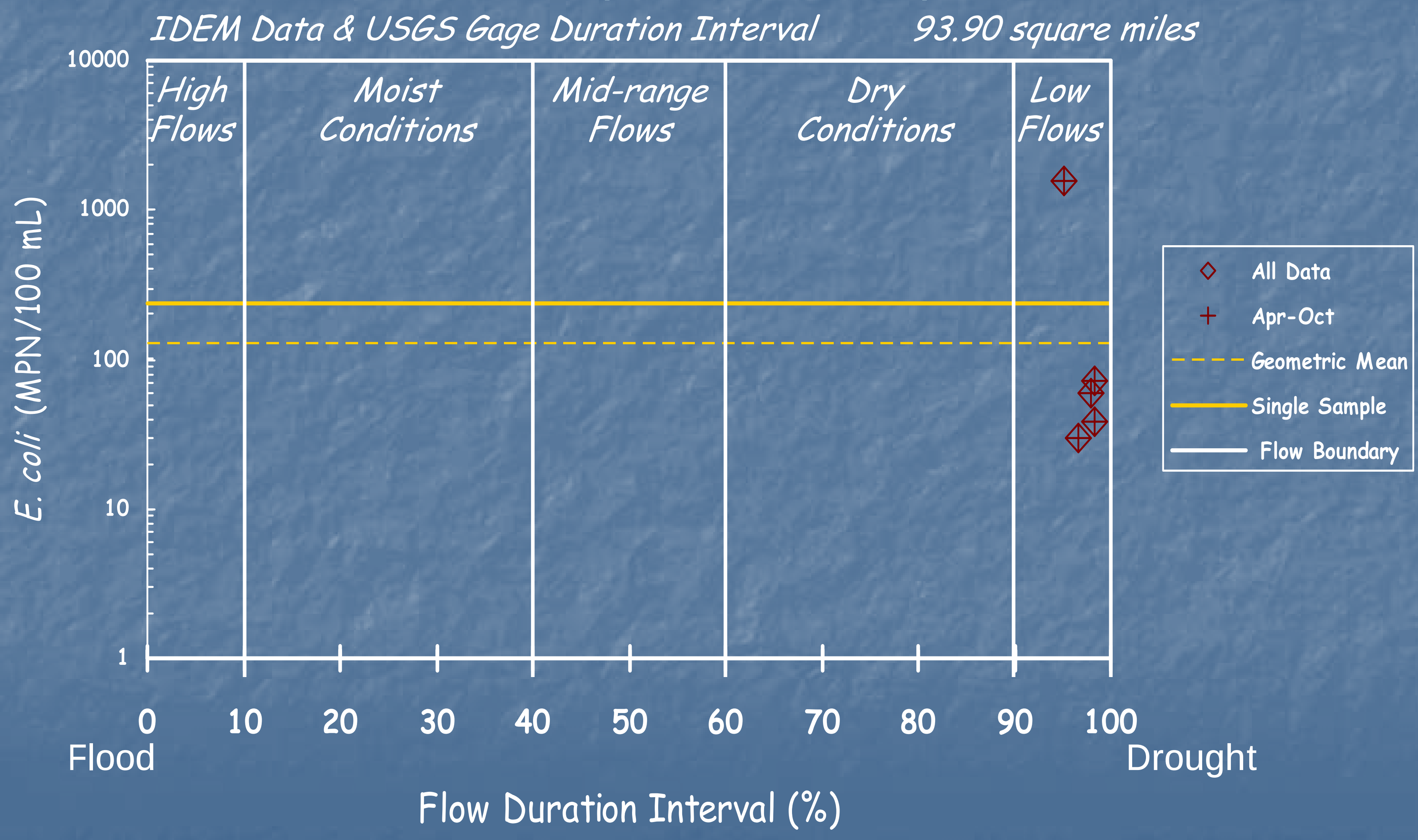
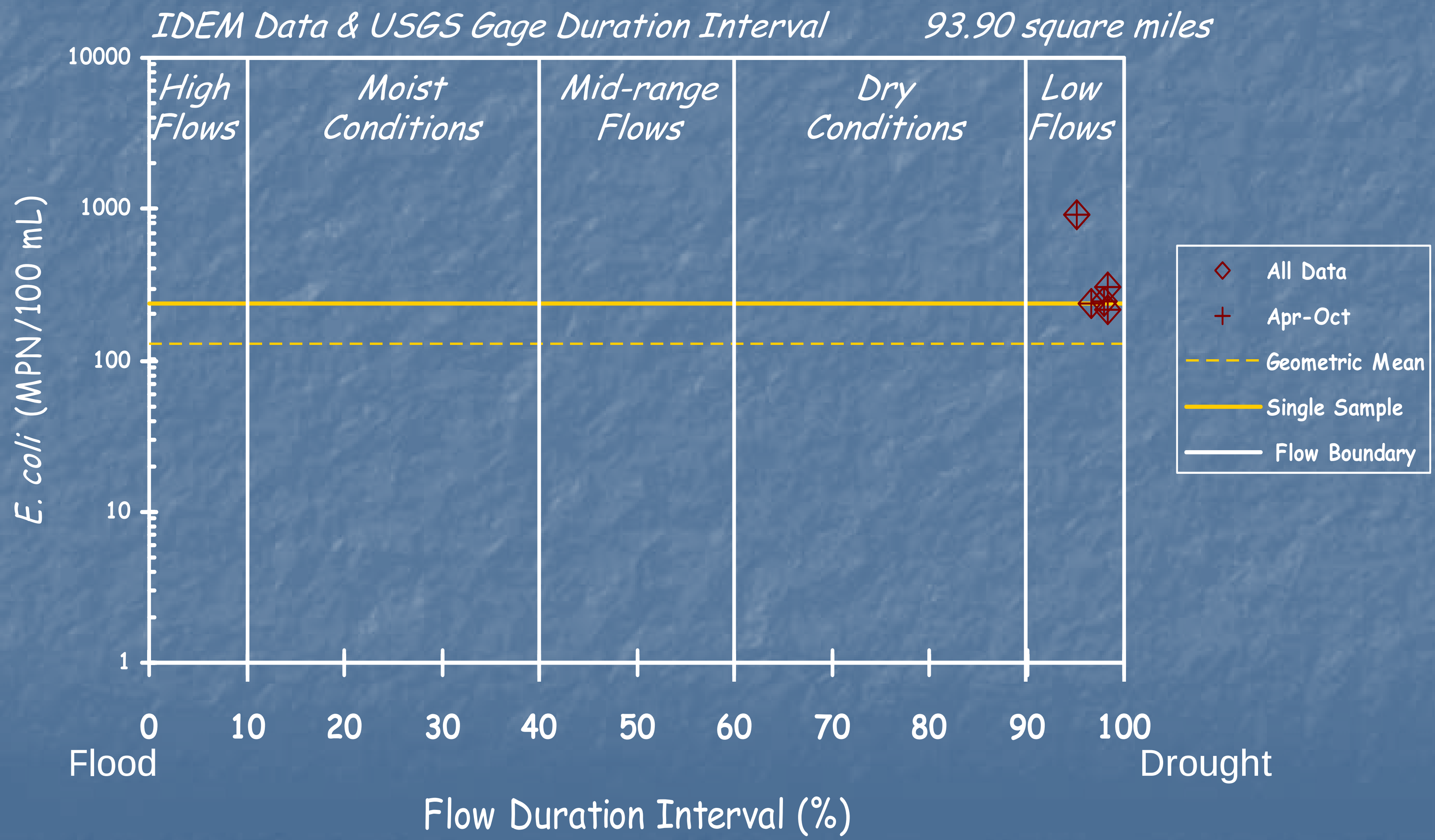
Pee Dee Ditch CR 900N
Water Quality Duration Curve (2002 Monitoring Data)
Site 1 (WED060-0011)



Sugar Creek CR 200S

Water Quality Duration Curve (2002 Monitoring Data)

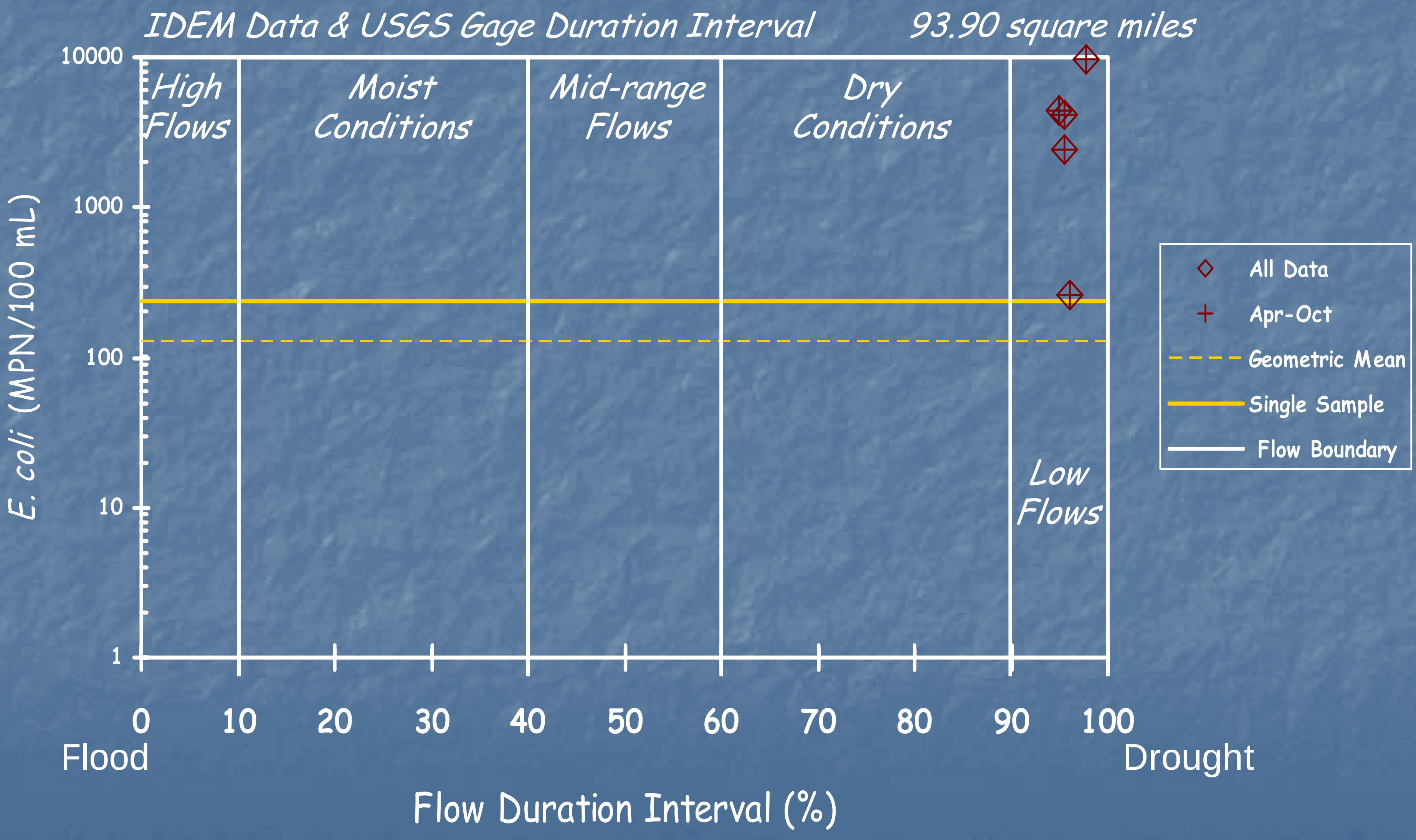
Site 9 (WED060-0017)



Little Sugar Creek CR 350N

Water Quality Duration Curve (2002 Monitoring Data)

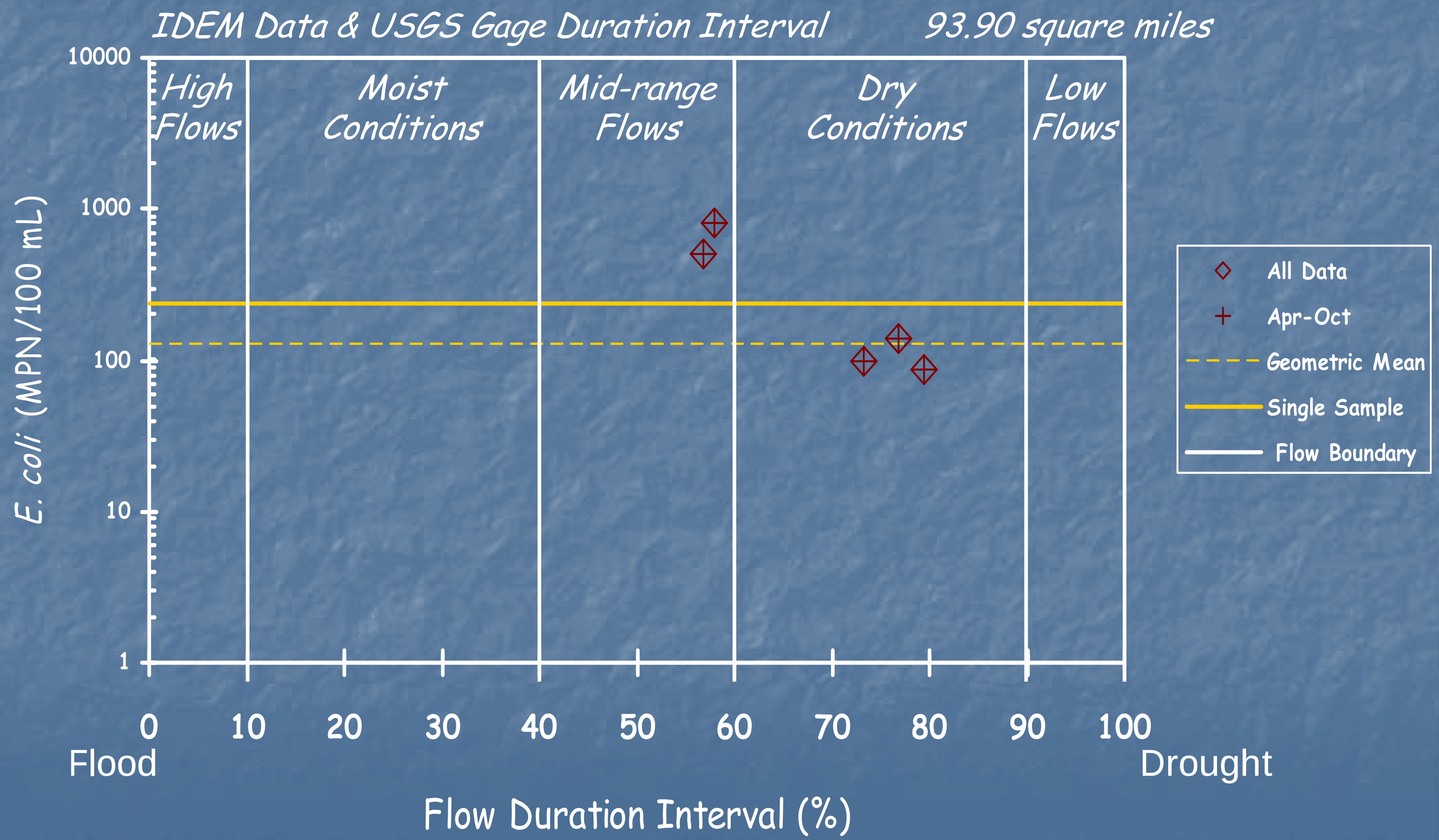
Site 11 (WED080-0014)



Sugar Creek North Street and Schoolhouse Road

Water Quality Duration Curve (2002 Monitoring Data)

Site 14 (WED090-0026)



Attachment C

Load Duration Curves for the Sugar Creek Watershed TMDL

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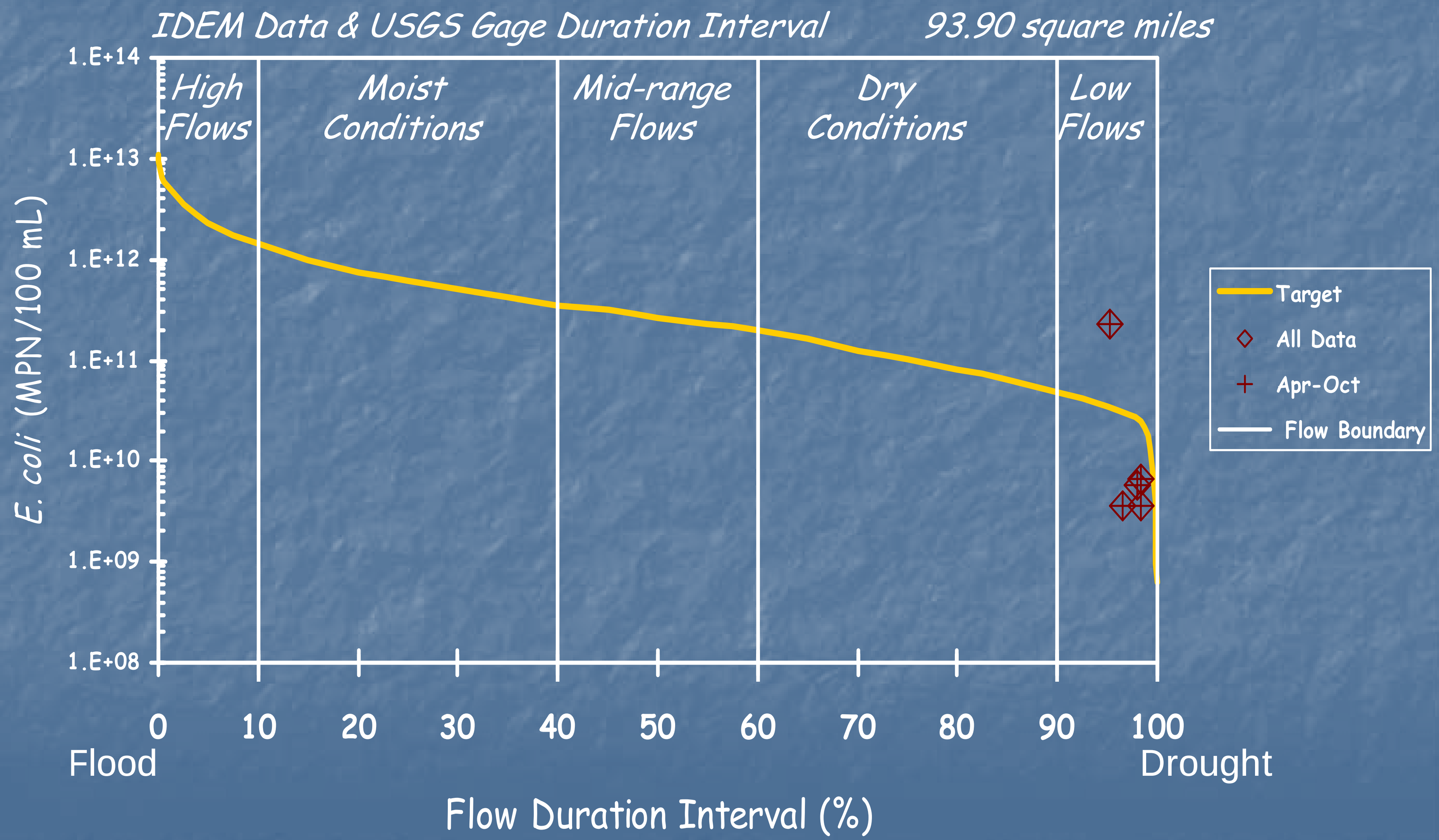
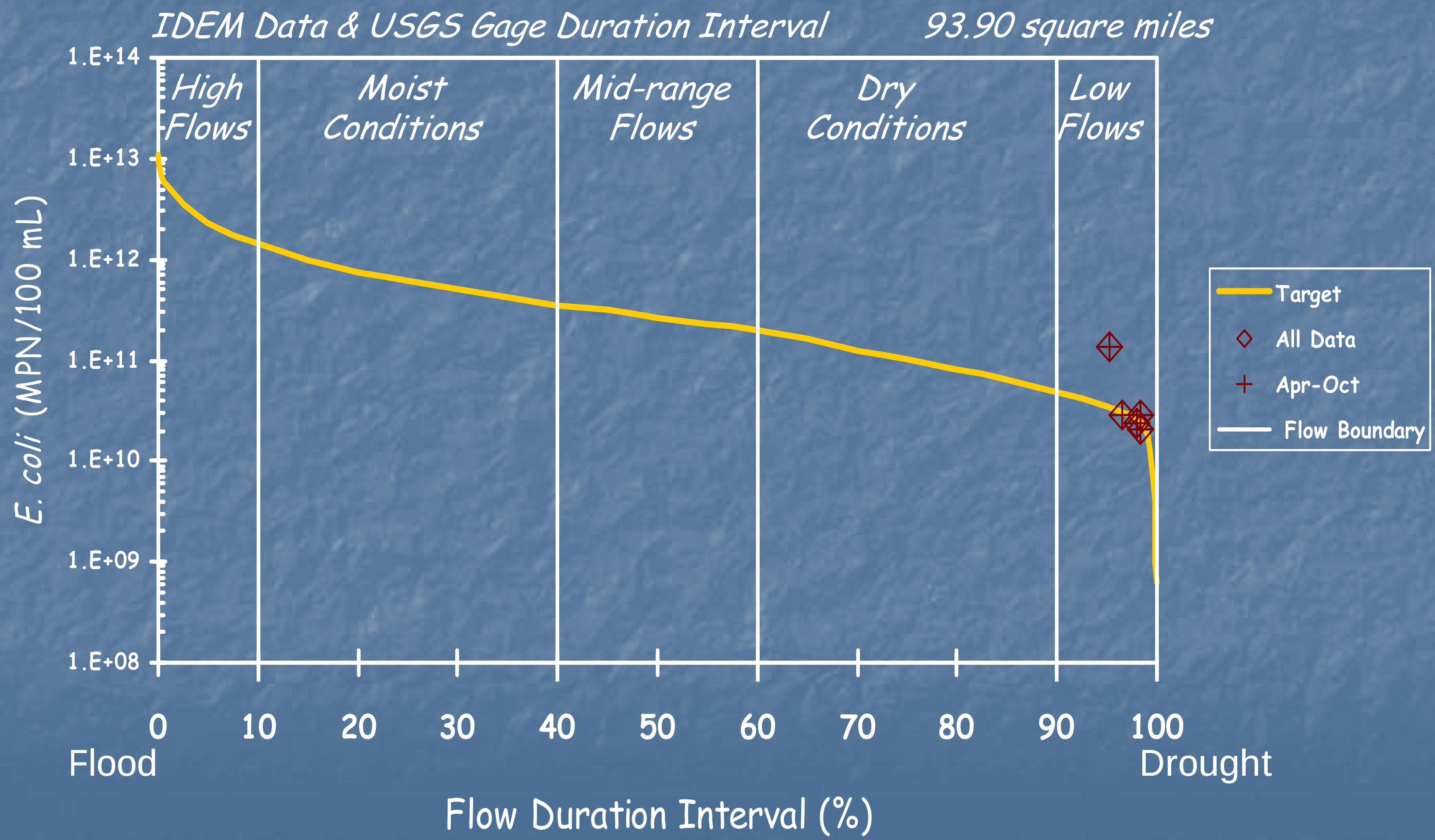
Pee Dee Ditch CR 900N

Load Duration Curve (2002 Monitoring Data)

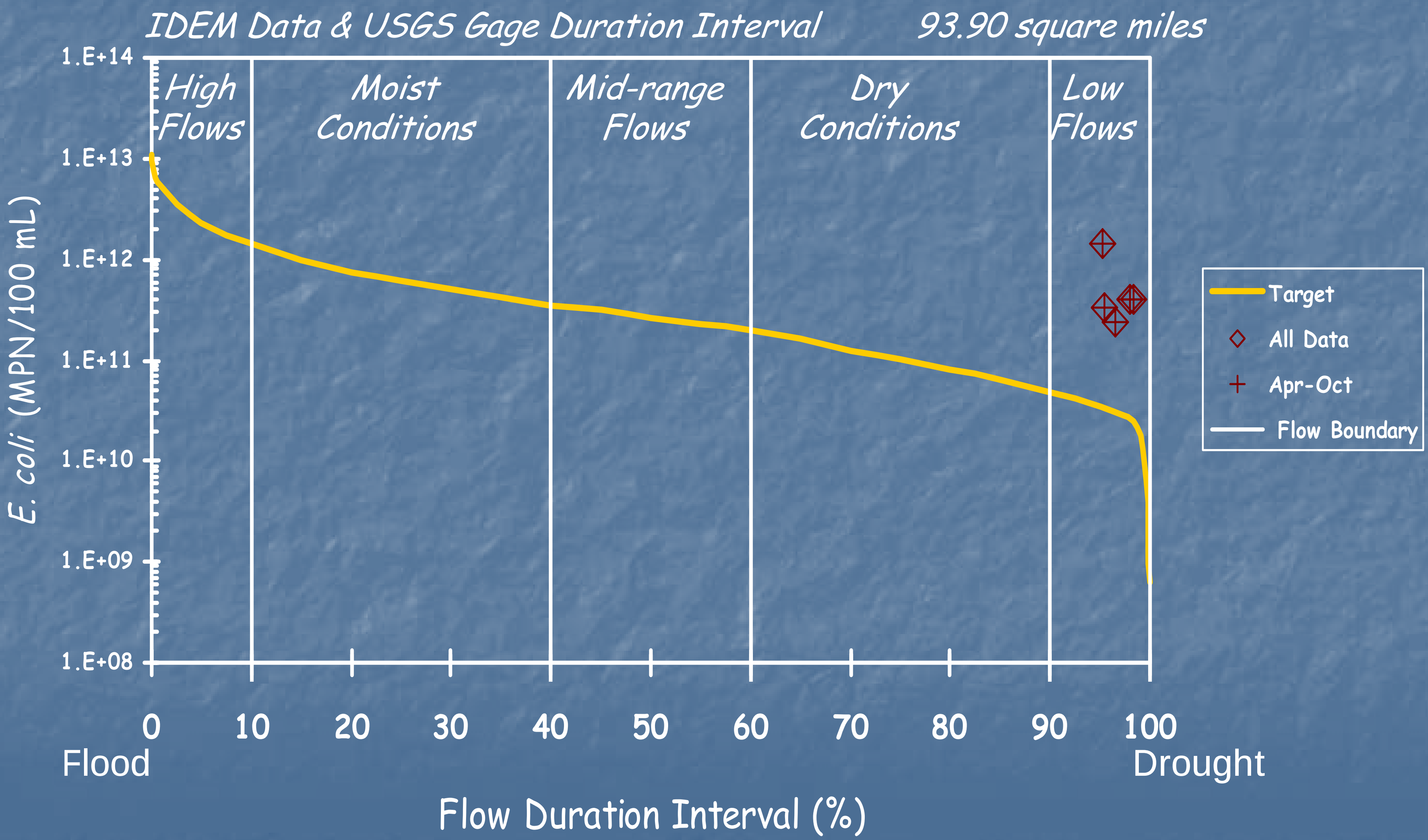
Site 1 (WED060-0011)



Sugar Creek CR 200S
Load Duration Curve (2002 Monitoring Data)
Site 9 (WED060-0017)



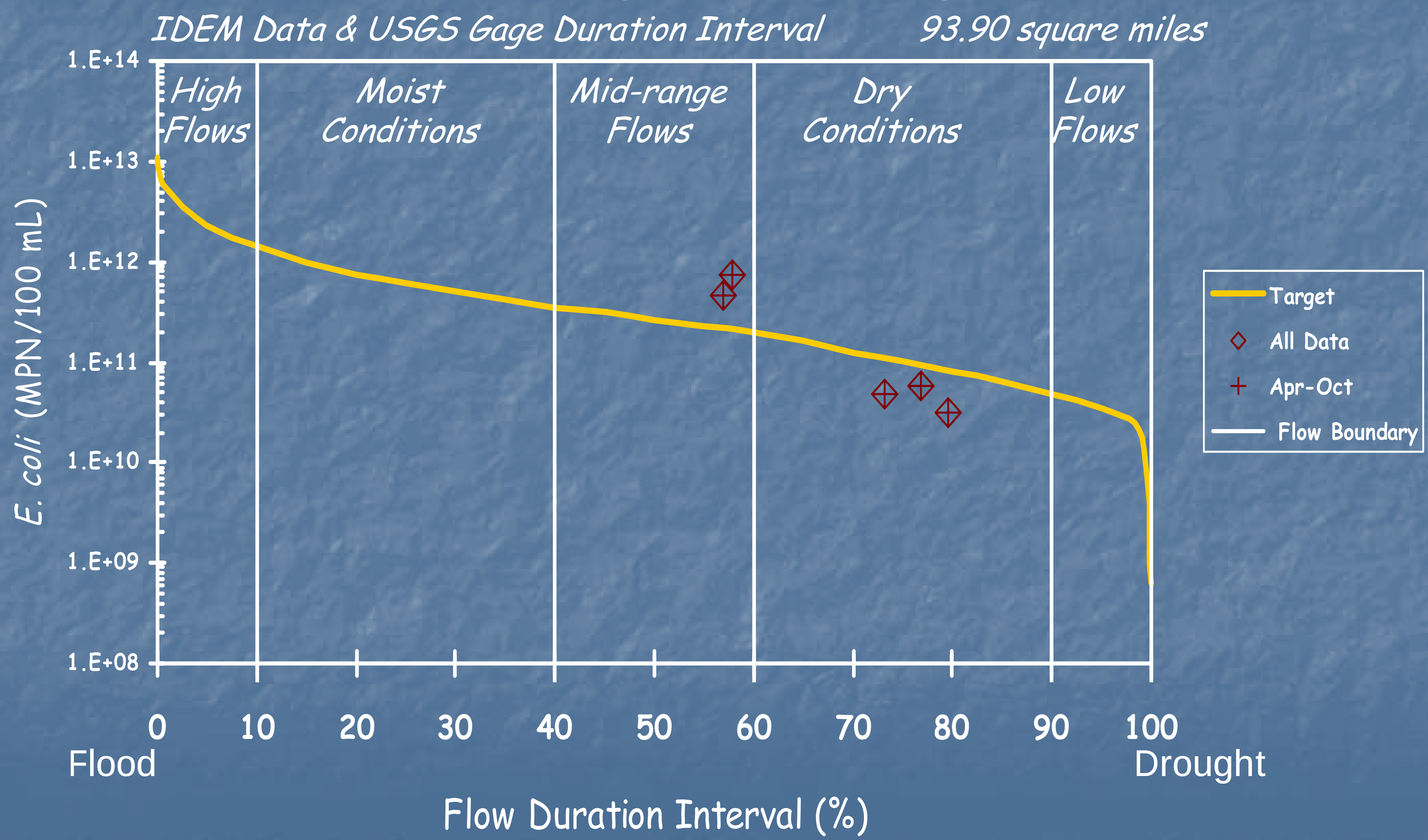
Little Sugar Creek CR 350N, W of CR 700E
Load Duration Curve (2002 Monitoring Data)
Site 11 (WED080-0014)



Sugar Creek North Street and Schoolhouse Road

Load Duration Curve (2002 Monitoring Data)

Site 14 (WED090-0026)



Attachment D

Load Reductions for the Sugar Creek Watershed TMDL

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Stream Name	Site Number	L-Site Number	*E. coli* Geometric Mean	Percent Reduction Needed
Pee Dee Ditch	1	WED060-0011	94.87	NA
Sugar Creek - Downstream of Grain Creek	2	WED060-0009	71.41	NA
Sugar Creek - Downstream of Grain Creek	3	WED060-0012	44.21	NA
Marsh and Trees Ditch	4	WED060-0013	30.88	NA
Sugar Creek - Barrett Ditch	5	WED060-0014	214.02	41.59%
Sugar Creek - Barrett Ditch	6	WED060-0018	167.85	25.53%
Sugar Creek - Boyd Ditch	7	WED060-0015	448.55	72.13%
Kirkhoff Ditch	8	WED060-0016	263.66	52.59%
Sugar Creek - Needham	9	WED060-0017	309.27	59.58%
Sugar Creek - Needham	10	WED060-0002	17.14	NA
Little Sugar Creek	11	WED080-0014	3846.25	96.75%
Sugar Creek - McCue Medsker Ditch	12	WED080-0013	443.24	71.80%
Herriotts Creek	13	WED090-0027	347.95	64.08%
Sugar Creek - Herriotts Creek	14	WED090-0026	217.68	42.58%
Sugar Creek - Herriotts Creek	15	WED090-0004	126.35	1.07%

Site Number	PROJECTNAM	PROJECTID	STREAMNAME
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
10	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
2	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Pee Dee Ditch
	2002 Sugar Creek E.coli	209	Pee Dee Ditch
1	2002 Sugar Creek E.coli	209	Pee Dee Ditch
	2002 Sugar Creek E.coli	209	Pee Dee Ditch
	2002 Sugar Creek E.coli	209	Pee Dee Ditch
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
3	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
4	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
	2002 Sugar Creek E.coli	209	Marsh and Trees Ditch
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
5	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
7	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch
8	2002 Sugar Creek E.coli	209	Kirkhoff Ditch
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch
	2002 Sugar Creek E.coli	209	Kirkhoff Ditch

	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
9	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
6	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	2002 Sugar Creek E.coli	209	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	1997 Synoptic	10	Little Sugar Cr
	1997 Synoptic	10	Little Sugar Cr
	1997 Synoptic	10	Little Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
12	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
11	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Little Sugar Cr
	1991 Fixed Station	2	Sugar Cr
	1991 Fixed Station	2	Sugar Cr
	1991 Fixed Station	2	Sugar Cr
	1992 Fixed Station	59	Sugar Cr
	1992 Fixed Station	59	Sugar Cr
	1992 Fixed Station	59	Sugar Cr
	1993 Fixed Station	60	Sugar Cr
	1993 Fixed Station	60	Sugar Cr
	1994 Fixed Station	61	Sugar Cr
	1995 Fixed Station	6	Sugar Cr
	1995 Fixed Station	6	Sugar Cr
	1995 Fixed Station	6	Sugar Cr
	1995 Fixed Station	6	Sugar Cr
	1996 Fixed Station	7	Sugar Cr
	1996 Fixed Station	7	Sugar Cr
	1996 Fixed Station	7	Sugar Cr

	1996 Fixed Station	7	Sugar Cr
	1997 Fixed Station	8	Sugar Cr
	1997 Fixed Station	8	Sugar Cr
	1997 Fixed Station	8	Sugar Cr
	1997 Fixed Station	8	Sugar Cr
	1998 Fixed Station	1	Sugar Cr
	1999 Fixed Station	62	Sugar Cr
	1999 Fixed Station	62	Sugar Cr
	1999 Fixed Station	62	Sugar Cr
	1999 Fixed Station	62	Sugar Cr
	1999 Fixed Station	62	Sugar Cr
15	1999 Fixed Station	62	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2000 Fixed Station	30	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2001 Fixed Station	105	Sugar Cr
	2002 Fixed Station	189	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2002 E. coli Muscatatuck and Upper EF WR	202	Sugar Cr
	2003 Fixed Station	257	Sugar Cr
	2003 Fixed Station	257	Sugar Cr
	2003 Fixed Station	257	Sugar Cr
	2003 Fixed Station	257	Sugar Cr
	2004 Fixed Station	513	Sugar Cr
	2004 Fixed Station	513	Sugar Cr
	2005 Fixed Station	776	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	1997 Synoptic	10	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
14	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Sugar Cr
	2002 Youngs Cr TMDL Assessment	210	Herriotts Cr
	2002 Youngs Cr TMDL Assessment	210	Herriotts Cr
13	2002 Youngs Cr TMDL Assessment	210	Herriotts Cr

2002 Youngs Cr TMDL Assessment	210 Herriotts Cr
2002 Youngs Cr TMDL Assessment	210 Herriotts Cr

DESCRIPTIO	HUCTO14	FSITE	LSITE	CTYNAME
U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock
U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock
U/s o CR 450 W from body shop lot,on s. side	5120204060050		WED060-0001	Hancock
US 52 at New Palestine	5120204060050		WED060-0002	Hancock
US 52 at New Palestine	5120204060050		WED060-0002	Hancock
US 52 at New Palestine	5120204060050		WED060-0002	Hancock
US 52 at New Palestine	5120204060050		WED060-0002	Hancock
US 52 at New Palestine	5120204060050		WED060-0002	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
CR 1000 N	5120204060020		WED060-0009	Hancock
SR 109	5120204060010		WED060-0010	Hancock
SR 109	5120204060010		WED060-0010	Hancock
SR 109	5120204060010		WED060-0010	Hancock
SR 109	5120204060010		WED060-0010	Hancock
CR 900 N	5120204060010		WED060-0011	Hancock
CR 900 N	5120204060010		WED060-0011	Hancock
CR 900 N	5120204060010		WED060-0011	Hancock
CR 900 N	5120204060010		WED060-0011	Hancock
CR 900 N	5120204060010		WED060-0011	Hancock
N. Nashville Rd.	5120204060020		WED060-0012	Hancock
N. Nashville Rd.	5120204060020		WED060-0012	Hancock
N. Nashville Rd.	5120204060020		WED060-0012	Hancock
N. Nashville Rd.	5120204060020		WED060-0012	Hancock
N. Nashville Rd.	5120204060020		WED060-0012	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060020		WED060-0013	Hancock
SR 234	5120204060030		WED060-0014	Hancock
SR 234	5120204060030		WED060-0014	Hancock
SR 234	5120204060030		WED060-0014	Hancock
SR 234	5120204060030		WED060-0014	Hancock
SR 234	5120204060030		WED060-0014	Hancock
SR 234	5120204060030		WED060-0014	Hancock
U-70	5120204060040		WED060-0015	Hancock
U-70	5120204060040		WED060-0015	Hancock
U-70	5120204060040		WED060-0015	Hancock
U-70	5120204060040		WED060-0015	Hancock
U-70	5120204060040		WED060-0015	Hancock
CR 100 N	5120204060040		WED060-0016	Hancock
CR 100 N	5120204060040		WED060-0016	Hancock
CR 100 N	5120204060040		WED060-0016	Hancock
CR 100 N	5120204060040		WED060-0016	Hancock
CR 100 N	5120204060040		WED060-0016	Hancock

CR 200 S	5120204060050		WED060-0017	Hancock
CR 200 S	5120204060050		WED060-0017	Hancock
CR 200 S	5120204060050		WED060-0017	Hancock
CR 200 S	5120204060050		WED060-0017	Hancock
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CR 200 S	5120204060050		WED060-0017	Hancock
CR 600 N	5120204060030		WED060-0018	Hancock
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CR 600 N	5120204060030		WED060-0018	Hancock
CR 600 N	5120204060030		WED060-0018	Hancock
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 275 N	5120204080050		WED080-0001	Shelby
CR 700 E	5120204080080		WED080-0002	Johnson
CR 700 E	5120204080080		WED080-0002	Johnson
CR 700 E	5120204080080		WED080-0002	Johnson
CR 550 E	5120204080100		WED080-0013	Johnson
CR 550 E	5120204080100		WED080-0013	Johnson
CR 550 E	5120204080100		WED080-0013	Johnson
CR 550 E	5120204080100		WED080-0013	Johnson
CR 550 E	5120204080100		WED080-0013	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
CR 350N, W of CR 700E	5120204080080		WED080-0014	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson

Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Near Edinburgh, Bridge to Atterbury W of US 31	5120204090080	SGR-1	WED090-0004	Johnson
Atterbury Rd	5120204090080		WED090-0006	Johnson
Atterbury Rd	5120204090080		WED090-0006	Johnson
Atterbury Rd	5120204090080		WED090-0006	Johnson
North St (DNR Schoolhouse Rd & North St)	5120204090080		WED090-0026	Johnson
North St (DNR Schoolhouse Rd & North St)	5120204090080		WED090-0026	Johnson
North St (DNR Schoolhouse Rd & North St)	5120204090080		WED090-0026	Johnson
North St (DNR Schoolhouse Rd & North St)	5120204090080		WED090-0026	Johnson
North St (DNR Schoolhouse Rd & North St)	5120204090080		WED090-0026	Johnson
Schoolhouse Rd	5120204090080		WED090-0027	Johnson
Schoolhouse Rd	5120204090080		WED090-0027	Johnson
Schoolhouse Rd	5120204090080		WED090-0027	Johnson

Schoolhouse Rd	5120204090080	WED090-0027	Johnson
Schoolhouse Rd	5120204090080	WED090-0027	Johnson

SAMPLEDATE	XSAMPLENUM	SAMPLENUMB	E__COLI__C	E__COLI__M	Geometric Mean
5/29/1997 0:00	DA10232	DA10232	3400		
7/10/1997 0:00	DA10343	DA10343	2200		
9/16/1997 0:00	DA10446	DA10446	240		
9/18/2002 0:00	AA13669	AA13669		14.8	
9/26/2002 0:00	AA13734	AA13734		10.8	
10/2/2002 0:00	AA14006	AA14006		17.3	
10/9/2002 0:00	AA14019	AA14019		10.8	
10/16/2002 0:00	AA14033	AA14033		49.6	17.14
9/18/2002 0:00	AA13658	AA13658		131.7	
9/26/2002 0:00	AA13723	AA13723		185	
9/26/2002 0:00	AA13735 (D)	AA13735		185	
10/2/2002 0:00	AA13994	AA13994		80.1	
10/9/2002 0:00	AA14007	AA14007		35.9	
10/16/2002 0:00	AA14022	AA14022		26.5	83.08
9/26/2002 0:00	AA13725	AA13725		613.1	
10/2/2002 0:00	AA13996	AA13996		410.6	
10/9/2002 0:00	AA14009	AA14009		770.1	
10/16/2002 0:00	AA14024	AA14024		579.4	
9/18/2002 0:00	AA13661	AA13661		1553.07	
9/26/2002 0:00	AA13726	AA13726		38.8	
10/2/2002 0:00	AA13997	AA13997		72.3	
10/9/2002 0:00	AA14010	AA14010		29.5	
10/16/2002 0:00	AA14025	AA14025		59.8	94.87
9/18/2002 0:00	AA13662	AA13662		42.8	
9/26/2002 0:00	AA13727	AA13727		103.9	
10/2/2002 0:00	AA13998	AA13998		67.7	
10/9/2002 0:00	AA14011	AA14011		21.1	
10/16/2002 0:00	AA14026	AA14026		26.6	44.21
9/18/2002 0:00	AA13663	AA13663		137.4	
9/18/2002 0:00	AA13670 (D)	AA13670		107.6	
9/26/2002 0:00	AA13728	AA13728		10.8	
10/2/2002 0:00	AA13999	AA13999		25	
10/9/2002 0:00	AA14012	AA14012		20.1	
10/16/2002 0:00	AA14027	AA14027		10.8	30.88
9/18/2002 0:00	AA13664	AA13664		131.7	
9/26/2002 0:00	AA13729	AA13729		155.3	
10/2/2002 0:00	AA14000	AA14000		488.4	
10/2/2002 0:00	AA14001	AA14001		517.2	
10/9/2002 0:00	AA14013	AA14013		127.4	
10/16/2002 0:00	AA14028	AA14028		146	214.02
9/18/2002 0:00	AA13666	AA13666		137.6	
9/26/2002 0:00	AA13731	AA13731		167.4	
10/2/2002 0:00	AA14003	AA14003		2419.2	
10/9/2002 0:00	AA14015	AA14015		1553.07	
10/16/2002 0:00	AA14030	AA14030		209.8	448.55
9/18/2002 0:00	AA13667	AA13667		127.4	
9/26/2002 0:00	AA13732	AA13732		488.4	
10/2/2002 0:00	AA14004	AA14004		218.7	
10/9/2002 0:00	AA14016	AA14016		437.1	
10/16/2002 0:00	AA14031	AA14031		214.2	263.66

9/18/2002 0:00	AA13668	AA13668		920.8	
9/26/2002 0:00	AA13733	AA13733		307.6	
10/2/2002 0:00	AA14005	AA14005		218.7	
10/9/2002 0:00	AA14017	AA14017		228.2	
10/9/2002 0:00	AA14018 (D)	AA14018		249.5	
10/16/2002 0:00	AA14032	AA14032		248.1	309.27
9/18/2002 0:00	AA13665	AA13665		344.8	
9/26/2002 0:00	AA13730	AA13730		365.4	
10/2/2002 0:00	AA14002	AA14002		93.3	
10/9/2002 0:00	AA14014	AA14014		65.7	
10/16/2002 0:00	AA14029	AA14029		172.5	167.85
5/29/1997 0:00	DA10234	DA10234	450		
7/10/1997 0:00	DA10345	DA10345	800		
9/16/1997 0:00	DA10448	DA10448	220		
9/9/2002 0:00	AA13578	AA13578		131.7	
9/18/2002 0:00	AA13644	AA13644		152.9	
9/25/2002 0:00	AA13719	AA13719		298.7	
9/25/2002 0:00	AA13722 (D)	AA13722		365.4	
10/2/2002 0:00	AA13988	AA13988		198.9	
10/9/2002 0:00	AA14083	AA14083		143.9	
5/29/1997 0:00	DA10235	DA10235	3400		
7/10/1997 0:00	DA10346	DA10346	2400		
9/16/1997 0:00	DA10449	DA10449	430		
7/2/2002 0:00	AA10898	AA10898		730	
7/9/2002 0:00	AA12205	AA12205	370		
7/16/2002 0:00	AA12298	AA12298		390	
7/23/2002 0:00	AA12408	AA12408		580	
7/30/2002 0:00	AA12443	AA12443		280	443.24
9/9/2002 0:00	AA13645	AA13645		2419	
9/18/2002 0:00	AA13643	AA13643		9804	
9/25/2002 0:00	AA13718	AA13718		4106	
9/25/2002 0:00	AA13720	AA13720		259	
10/2/2002 0:00	AA13987	AA13987		4352	
10/9/2002 0:00	AA14082	AA14082		1986.28	3846.25
7/1/1991 0:00	DI9189	DI9189	20		
9/30/1991 0:00	DI9501	DI9501	130		
12/3/1991 0:00	DI9814	DI9814	380		
4/6/1992 0:00	DI12081	DI12081	20		
10/30/1992 0:00	DI13430	DI13430	100		
11/30/1992 0:00	DI13561	DI13561	310		
2/3/1993 0:00	DI13920	DI13920	120		
5/24/1993 0:00	DI14407	DI14407	20		
11/1/1994 0:00	DI17607	DI17607	260		
4/10/1995 0:00	DI18755	DI18755	30		
7/17/1995 0:00	DI19410	DI19410	700		
11/1/1995 0:00	DI20322	DI20322	< 10		
12/5/1995 0:00	DI20626	DI20626	20		
1/17/1996 0:00	DI20734	DI20734	350		
5/29/1996 0:00	DI21246	DI21246	7900		
7/25/1996 0:00	DI22004	DI22004	380		

11/1/1996 0:00	DI22782	DI22782	30		
1/30/1997 0:00	DI23210	DI23210	260		
5/7/1997 0:00	DI23544	DI23544	30		
8/29/1997 0:00	DI23879	DI23879	100		
12/17/1997 0:00	DI24596	DI24596	< 10		
2/12/1998 0:00	DI24840	DI24840	160 (H)		
5/5/1999 0:00	DI27311	DI27311	120		
5/5/1999 0:00	DI27328 (D)	DI27328	90		
6/16/1999 0:00	DI27509	DI27509	266		
6/16/1999 0:00	DI27526 (D)	DI27526	217		
9/2/1999 0:00	DI28101	DI28101	10		
12/8/1999 0:00	DI28686	DI28686	325		
3/8/2000 0:00	DI29264	DI29264		19	
6/6/2000 0:00	DI29837	DI29837		57	
8/15/2000 0:00	DI30251	DI30251		47	
8/15/2000 0:00	DI30260 (D)	DI30260		37	
10/17/2000 0:00	DI30625	DI30625		820	
12/5/2000 0:00	DI30994	DI30994		130	
12/5/2000 0:00	DI31004 (D)	DI31004		110	
2/6/2001 0:00	DI31377	DI31377		270	
2/6/2001 0:00	DI31386 (D)	DI31386		150	
4/17/2001 0:00	DI31790	DI31790		88	
6/21/2001 0:00	DI32188	DI32188		490	
8/2/2001 0:00	DI32587	DI32587		100	
10/3/2001 0:00	DI32973	DI32973		64	
10/3/2001 0:00	DI32984 (D)	DI32984		60	
6/6/2002 0:00	AA11251	AA11251		1100	
9/9/2002 0:00	AA13572	AA13572		126.7	
9/16/2002 0:00	AA13596	AA13596		68.3	
9/23/2002 0:00	AA13671	AA13671		307.8	
9/30/2002 0:00	AA13940	AA13940		133.3	
10/7/2002 0:00	AA14035	AA14035		90.7	126.35
4/15/2003 0:00	AA15536	AA15536		46	
4/15/2003 0:00	AA15537 (D)	AA15537		50	
6/3/2003 0:00	AA16499	AA16499		390	
8/7/2003 0:00	AA18034	AA18034		73	
5/6/2004 0:00	AA22565	AA22565		54	
6/9/2004 0:00	AA23092	AA23092		200	
3/10/2005 0:00	AA26093	AA26093		70	
5/29/1997 0:00	DA10236	DA10236	370		
7/10/1997 0:00	DA10347	DA10347	130		
9/16/1997 0:00	DA10450	DA10450	30		
7/2/2002 0:00	AA10896	AA10896		820	
7/9/2002 0:00	AA12203	AA12203	99		
7/16/2002 0:00	AA12296	AA12296		86	
7/23/2002 0:00	AA12406	AA12406		500	
7/30/2002 0:00	AA12441	AA12441		140	217.68
7/2/2002 0:00	AA10897	AA10897		1	
7/9/2002 0:00	AA12204	AA12204	920		
7/16/2002 0:00	AA12297	AA12297		1100	

7/23/2002 0:00	AA12407	AA12407	2400	
7/30/2002 0:00	AA12442	AA12442	2100	347.95

Site ID	WaterShed Name	River Name	Description	Time	Date	Weather
100	Driftwood 05120204	Sugar Creek	Betty Thomas		7/11/2000	Clear/Sunny
100	Driftwood 05120204	Sugar Creek	Betty Thomas		11/2/2000	Overcast
618	Driftwood 05120204	Sugar Creek	West 400 South	2	4/5/2004	Clear/Sunny
618	Driftwood 05120204	Sugar Creek	West 400 South	0.5	8/21/2004	Clear/Sunny
618	Driftwood 05120204	Sugar Creek	West 400 South	1.5	10/30/2004	Clear/Sunny
618	Driftwood 05120204	Sugar Creek	West 400 South	2	6/19/2005	Overcast
618	Driftwood 05120204	Sugar Creek	West 400 South	1.5	9/3/2005	Clear/Sunny
618	Driftwood 05120204	Sugar Creek	West 400 South	1	10/25/2005	Overcast

Past Weather	Water Quality Score	DO (ppm)	DO (% Saturation)	E-coli (colonies 100 mL)
Clear/Sunny	86.22	6	70	0
Clear/Sunny	76.32	10.33	88	4
Clear/Sunny	NA			40
Clear/Sunny	NA	8	95	
Clear/Sunny	NA	4	1	
Overcast	51.85	4	50	
Clear/Sunny	NA	4	53	
Overcast	60.07	4	36	

General Coliforms (colonies 100 mL)	pH	BOD 5 (mg/L)	Water Temp (C)	Temp Change (C)
	8.2			1
	7.8	10.33		-5
		4	21	-2
		4	18	-2
	7.67	4	19.67	-2.3
	7.83	0	21	
	7.5	0	10	-1.8

Orthophosphate (mg/l)	Total Phosphate (mg/L)	Nitrate NO3 (mg/l)	Nitrite NO2 (mg/l)
		0.35	
	0.55	0.79	
		73.33	0
		22	0.165
		44	0

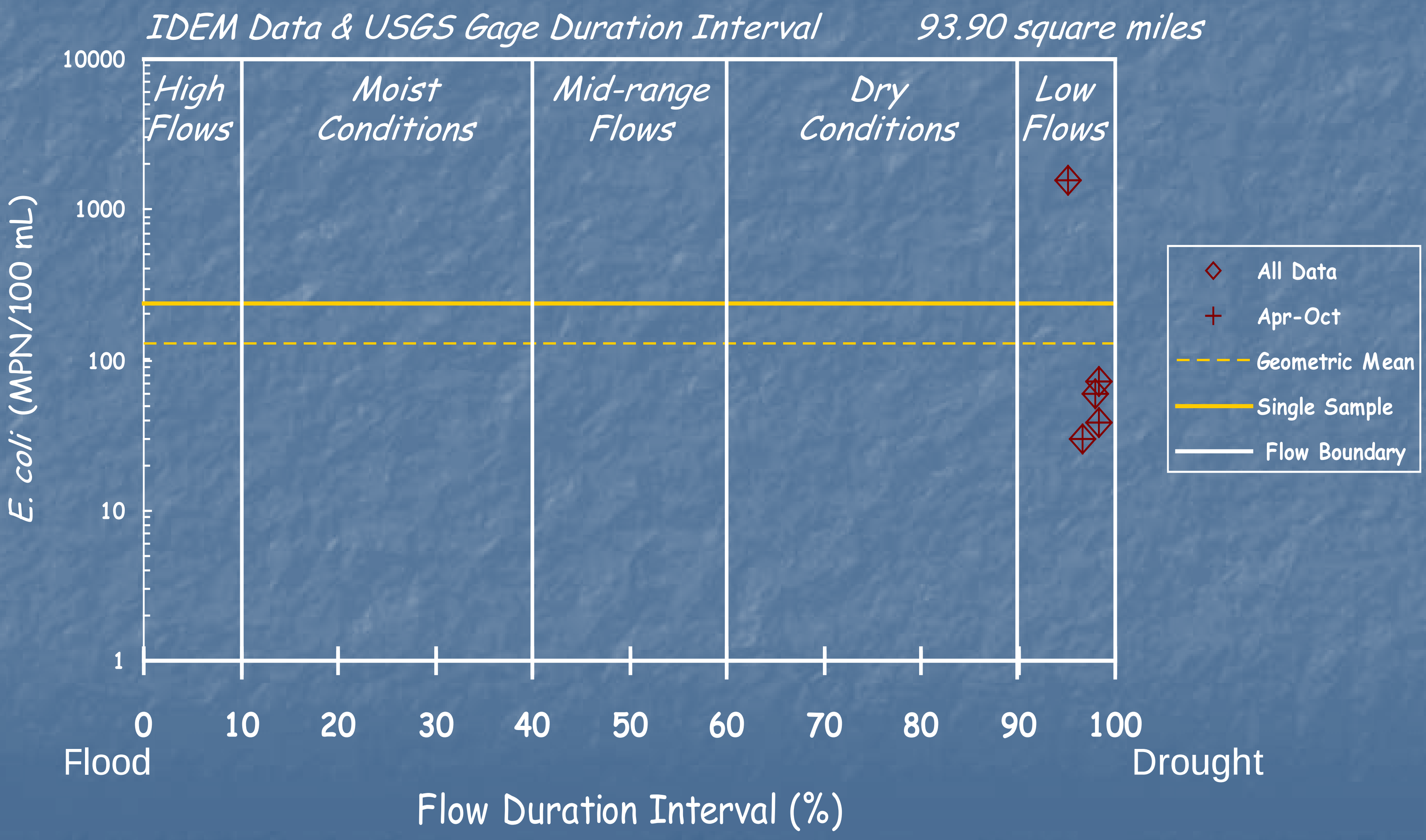
Turbidity (NTU)
0.15
5
10
10
60
25
20

Site Number	Project Name	Stream Name	Description	LSITE	County	Sample Date	Sample Number	E. coli (CFU/100 mL)	E. coli (MPN/100 mL)	Geometric Mean
1	2002 Sugar Creek E.coli	Pee Dee Ditch	CR 900 N	WED060-0011	Hancock	9/18/2002 0:00	AA13661		1553.07	
						9/26/2002 0:00	AA13726		38.8	
						10/2/2002 0:00	AA13997		72.3	
						10/9/2002 0:00	AA14010		29.5	
						10/16/2002 0:00	AA14025		59.8	94.87
2	2002 Sugar Creek E.coli	Sugar Cr	CR 1000 N	WED060-0009	Hancock	9/18/2002 0:00	AA13658		131.7	
						9/26/2002 0:00	AA13723		185	
						9/26/2002 0:00	AA13735 (D)		185	
						10/2/2002 0:00	AA13994		80.1	
						10/9/2002 0:00	AA14007		35.9	
						10/16/2002 0:00	AA14022		26.5	71.41
3	2002 Sugar Creek E.coli	Sugar Cr	N. Nashville Rd.	WED060-0012	Hancock	9/18/2002 0:00	AA13662		42.8	
						9/26/2002 0:00	AA13727		103.9	
						10/2/2002 0:00	AA13998		67.7	
						10/9/2002 0:00	AA14011		21.1	
						10/16/2002 0:00	AA14026		26.6	44.21
4	2002 Sugar Creek E.coli	Marsh and Trees Ditch	SR 234	WED060-0013	Hancock	9/18/2002 0:00	AA13663		137.4	
						9/18/2002 0:00	AA13670 (D)		107.6	
						9/26/2002 0:00	AA13728		10.8	
						10/2/2002 0:00	AA13999		25	
						10/9/2002 0:00	AA14012		20.1	
						10/16/2002 0:00	AA14027		10.8	30.88
5	2002 Sugar Creek E.coli	Sugar Cr	SR 234	WED060-0014	Hancock	9/18/2002 0:00	AA13664		131.7	
						9/26/2002 0:00	AA13729		155.3	
						10/2/2002 0:00	AA14000		488.4	
						10/2/2002 0:00	AA14001		517.2	
						10/9/2002 0:00	AA14013		127.4	
						10/16/2002 0:00	AA14028		146	214.02
6	2002 Sugar Creek E.coli	Sugar Cr	CR 600 N	WED060-0018	Hancock	9/18/2002 0:00	AA13665		344.8	
						9/26/2002 0:00	AA13730		365.4	
						10/2/2002 0:00	AA14002		93.3	
						10/9/2002 0:00	AA14014		65.7	
						10/16/2002 0:00	AA14029		172.5	167.85
7	2002 Sugar Creek E.coli	Sugar Cr	U-70	WED060-0015	Hancock	9/18/2002 0:00	AA13666		137.6	
						9/26/2002 0:00	AA13731		167.4	
						10/2/2002 0:00	AA14003		2419.2	
						10/9/2002 0:00	AA14015		1553.07	
						10/16/2002 0:00	AA14030		209.8	448.55
8	2002 Sugar Creek E.coli	Kirkhoff Ditch	CR 100 N	WED060-0016	Hancock	9/18/2002 0:00	AA13667		127.4	
						9/26/2002 0:00	AA13732		488.4	
						10/2/2002 0:00	AA14004		218.7	
						10/9/2002 0:00	AA14016		437.1	
						10/16/2002 0:00	AA14031		214.2	263.66
9	2002 Sugar Creek E.coli	Sugar Cr	CR 200 S	WED060-0017	Hancock	9/18/2002 0:00	AA13668		920.8	
						9/26/2002 0:00	AA13733		307.6	
						10/2/2002 0:00	AA14005		218.7	
						10/9/2002 0:00	AA14017		228.2	
						10/9/2002 0:00	AA14018 (D)		249.5	
						10/16/2002 0:00	AA14032		248.1	309.27
10	2002 Sugar Creek E.coli	Sugar Cr	US 52 at New Palestine	WED060-0002	Hancock	9/18/2002 0:00	AA13669		14.8	
						9/26/2002 0:00	AA13734		10.8	
						10/2/2002 0:00	AA14006		17.3	
						10/9/2002 0:00	AA14019		10.8	
						10/16/2002 0:00	AA14033		49.6	17.14
11	2002 E. coli Muscatatuck and Upper EF WR	Little Sugar Cr	CR 350N, W of CR 700E	WED080-0014	Johnson	9/9/2002 0:00	AA13645		2419	
						9/18/2002 0:00	AA13643		9804	
						9/25/2002 0:00	AA13718		4106	
						9/25/2002 0:00	AA13720		259	
						10/2/2002 0:00	AA13987		4352	
						10/9/2002 0:00	AA14082		1986.28	3846.25
12	2002 Youngs Cr TMDL Assessment	Sugar Cr	CR 550 E	WED080-0013	Johnson	7/2/2002 0:00	AA10898		730	
						7/9/2002 0:00	AA12205	370		
						7/16/2002 0:00	AA12298		390	
						7/23/2002 0:00	AA12408		580	
						7/30/2002 0:00	AA12443		280	443.24
13	2002 Youngs Cr TMDL Assessment	Herriotts Cr	Schoolhouse Rd	WED090-0027	Johnson	7/2/2002 0:00	AA10897		1	
						7/9/2002 0:00	AA12204	920		
						7/16/2002 0:00	AA12297		1100	
						7/23/2002 0:00	AA12407		2400	
						7/30/2002 0:00	AA12442		2100	347.95
14	2002 Youngs Cr TMDL Assessment	Sugar Cr	North St (DNR Schoolhouse Rd & North St)	WED090-0026	Johnson	7/2/2002 0:00	AA10896		820	
						7/9/2002 0:00	AA12203	99		
						7/16/2002 0:00	AA12296		86	
						7/23/2002 0:00	AA12406		500	
						7/30/2002 0:00	AA12441		140	217.68
15	2002 E. coli Muscatatuck and Upper EF WR	Sugar Cr	Near Edinburgh, Bridge to Atterbury W of US 31	WED090-0004	Johnson	9/9/2002 0:00	AA13572		126.7	
						9/16/2002 0:00	AA13596		68.3	
						9/23/2002 0:00	AA13671		307.8	
						9/30/2002 0:00	AA13940		133.3	
						10/7/2002 0:00	AA14035		90.7	126.35

Pee Dee Ditch CR 900N

Water Quality Duration Curve (2002 Monitoring Data)

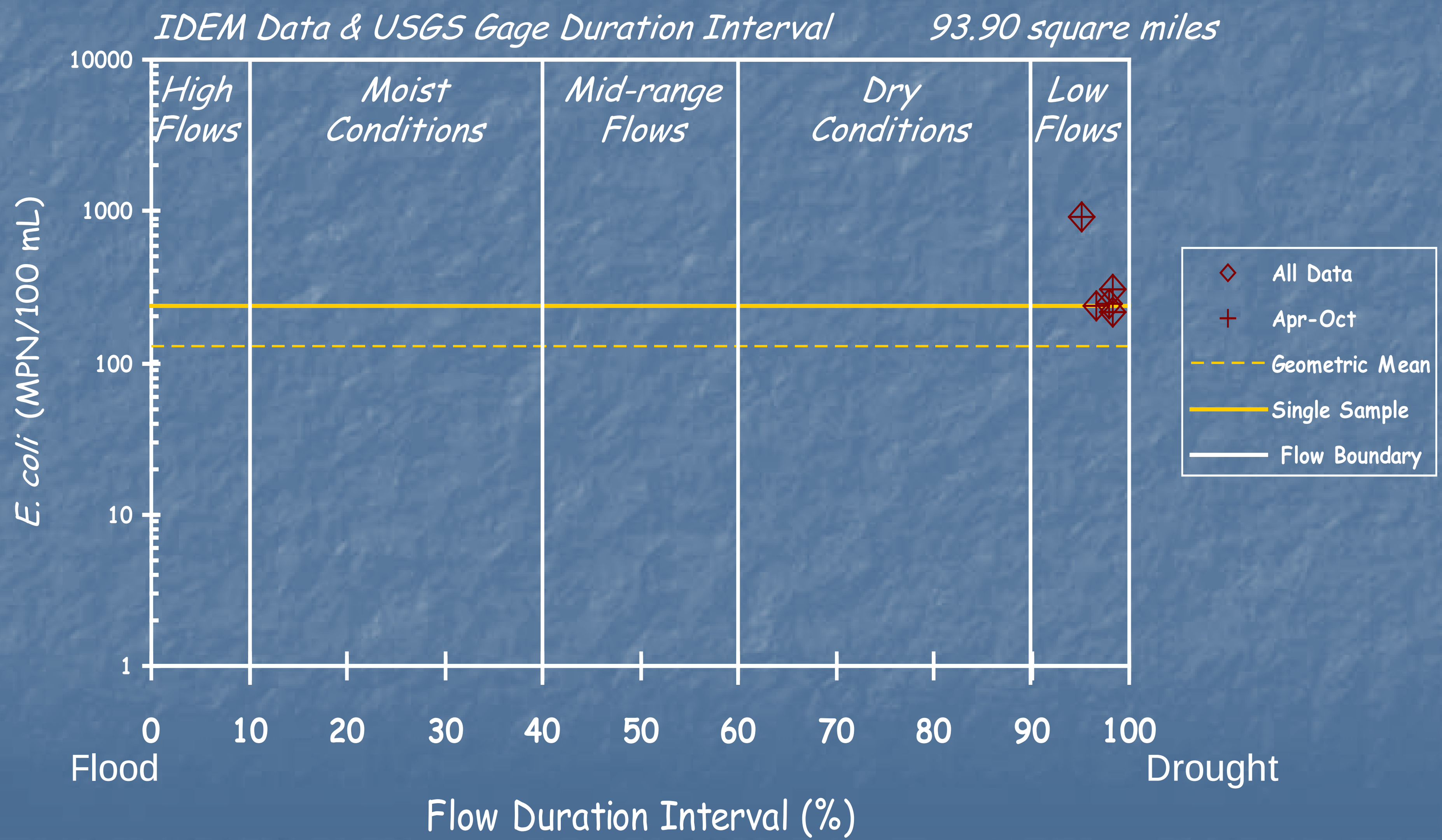
Site 1 (WED060-0011)



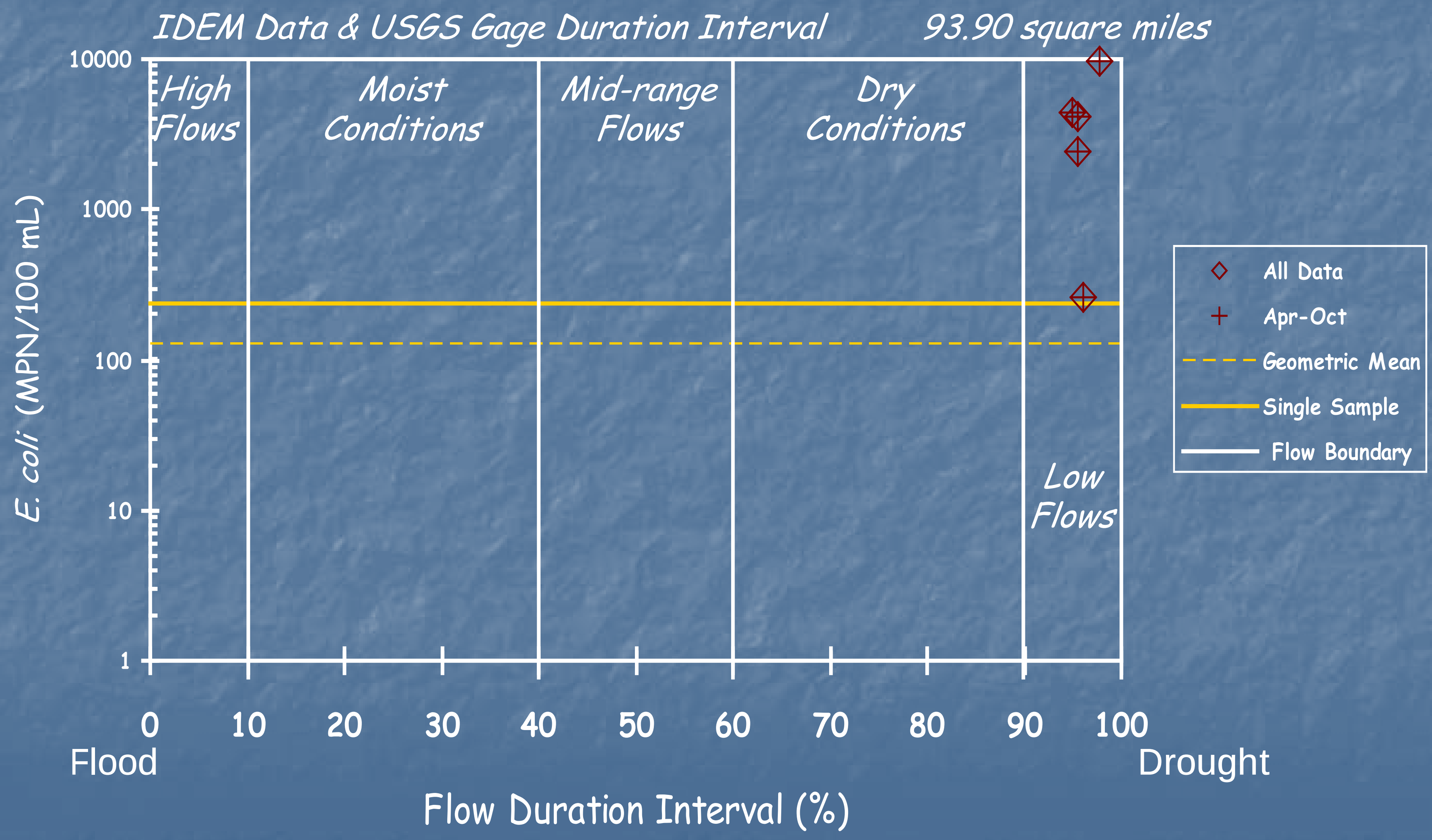
Sugar Creek CR 200S

Water Quality Duration Curve (2002 Monitoring Data)

Site 9 (WED060-0017)



Little Sugar Creek CR 350N
Water Quality Duration Curve (2002 Monitoring Data)
Site 11 (WED080-0014)



Sugar Creek North Street and Schoolhouse Road

Water Quality Duration Curve (2002 Monitoring Data)

Site 14 (WED090-0026)