STAGE 1 DRAFT FOR PUBLIC REVIEW

Big Creek Watershed HUC 0512011211 TMDL Stage 1 Report

Prepared for Illinois EPA

May 2021

CDM Smith

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Acronyms

BMPs	best management practices
CBOD	carbonaceous biochemical oxygen demand
cfs	cubic feet per second
CWA	Clean Water Act
DO	dissolved oxygen
GIS	geographic information system
IDA	Illinois Department of Agriculture
Illinois EPA	Illinois Environmental Protection Agency
IPCB	Illinois Pollution Control Board
ISWS	Illinois State Water Survey
LA	Load Allocation
LC	Loading Capacity
µg/L	micrograms per liter
mg/L	milligrams per liter
mL	milliliters
MOS	Margin of Safety
NA	not applicable
NASS	National Agricultural Statistics Service
NCDC	National Climatic Data Center
NCEI	National Centers for Environmental Information
NED	National Elevation Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
RC	Reserve Capacity
SOD	sediment oxygen demand
SSURGO	Soil Survey Geographic
STORET	Storage and Retrieval
TMDL	total maximum daily load
TSS	total suspended solids
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
USLE	Universal Soil Loss Equation
WBP	Watershed-based Plan
WLA	Waste Load Allocation

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Section 1

Goals and Objectives for the Big Creek Watershed

1.1 Total Maximum Daily Load Overview

A total maximum daily load, or TMDL, is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards. TMDLs are a requirement of Section 303(d) of the Clean Water Act (CWA). To meet this requirement, the Illinois Environmental Protection Agency (Illinois EPA) must identify water bodies not meeting water quality standards and then establish TMDLs for restoration of water quality. Illinois EPA develops a list known as the 303(d) list of water bodies not meeting water quality standards every two years, and it is included in the Integrated Water Quality Report. Water bodies on the 303(d) list are then targeted for TMDL development. Water bodies listed as impaired in this TMDL report are from the most recent final 2018 Integrated Water Quality Report and 303(d) list that was approved by USEPA on March 19, 2021[1]. In accordance with USEPA's guidance, the report assigns all waters of the state to one of five categories. 303(d) listed water bodies make up category five in the integrated report (Appendix A of the final 2018 Integrated Water Quality Report).

In general, a TMDL is a quantitative assessment of water quality impairments, contributing potential sources, and pollutant reductions needed to attain water quality standards. The TMDL specifies the amount of pollutant or other stressor that needs to be reduced to meet water quality standards, allocates pollutant control or management responsibilities among sources in a watershed, and provides a scientific and policy basis for taking actions needed to restore a water body.

Water quality standards are laws or regulations that states authorize to enhance water quality and protect public health and welfare. Water quality standards provide the foundation for accomplishing two of the principal goals of the CWA. These goals are:

- Restore and maintain the chemical, physical, and biological integrity of the nation's waters; and
- Where attainable, achieve water quality that promotes protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water.

Water quality standards consist of three elements:

- The designated beneficial use or uses of a water body or segment of a water body;
- The water quality criteria necessary to protect the use or uses of that water body; and
- An antidegradation policy.

[1] https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx

Examples of designated uses are primary contact (swimming), protection of aquatic life, and public and food processing water supply. Water quality criteria describe the quality of water that will support a designated use. Water quality criteria can be expressed as numeric limits or as a narrative statement. Antidegradation policies are adopted so that water quality improvements are conserved, maintained, and protected.

1.2 TMDL Goals and Objectives for the Big Creek Watershed

The Illinois EPA has a three-stage approach to TMDL development. The stages are:

Stage 1 – Watershed Characterization, Data Analysis, Methodology Selection

Stage 2 – Data Collection (optional)

Stage 3 – Model Calibration, TMDL Scenarios, Implementation Plan

Illinois EPA uses the US Geologic Survey (USGS) 10-digit hydrologic unit code (HUC) to group subbasins into TMDL watersheds. This report addresses Stage 1 TMDL development for the Big Creek watershed (HUC 0512011211). Stages 2 and 3 will be conducted upon completion of Stage 1. Stage 2 is optional as data collection may not be necessary if existing data are adequate to calculate the TMDL.

Following this process, the TMDL goals and objectives for the Big Creek watershed will include developing a TMDL for the impaired water body within the watershed, describing all the necessary elements of the TMDL, developing a watershed-based plan (WBP) for implementing each TMDL, and gaining public acceptance of the process. The following impaired water body segment within the Big Creek watershed is addressed in this report:

- Dogwood Creek (BEDB-01)

The impaired water body segment is shown on **Figure 1-1** and is the only impaired stream segment within the Big Creek watershed for which TMDLs and/or water quality goals will be developed. **Table 1-1** lists the water body segment, potential causes and sources of impairment.

Illinois EPA is currently only developing TMDLs for parameters that have numeric water quality standards. For potential causes that do not have numeric water quality standards, as noted in Table 1-1, TMDLs will be deferred until those criteria are developed. However, until numeric criteria are adopted, WBPs will be developed using percent reduction goals that have been established by Illinois EPA. In addition, some of these potential causes may be addressed by implementation of controls for the pollutants with numeric water quality standards.

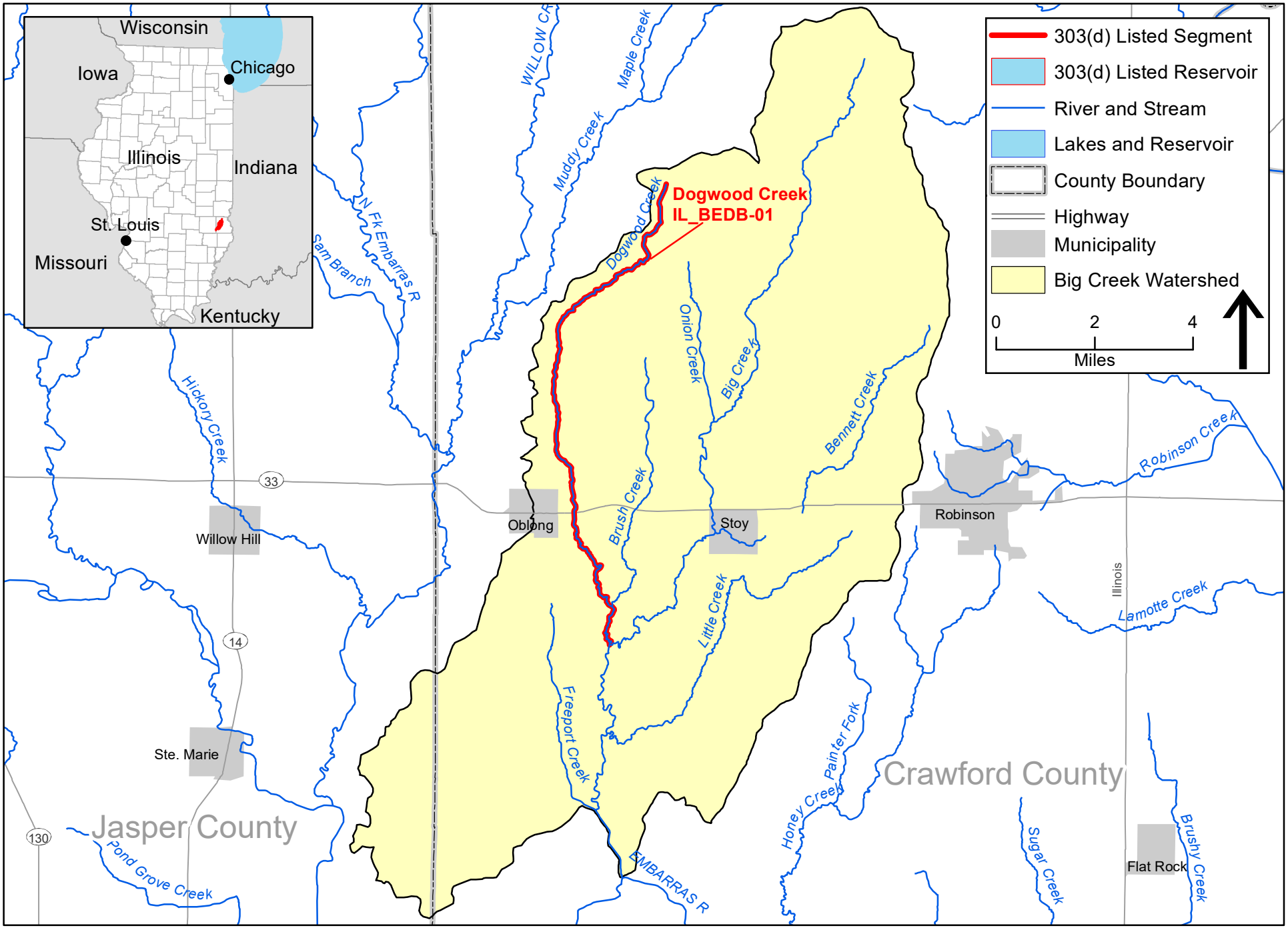

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Figure 1-1: Big Creek Watershed, HUC 0512011211

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Table 1-1 Impaired Water Body in the Big Creek Watershed

Segment ID	Segment Name	Potential Causes of Impairment	Designated Use	Potential Sources (as identified by the 2018 303(d) list)
BEDB-01	Dogwood Creek	**Dissolved Oxygen**	Aquatic Life	Crop Production, Source Unknown*
		Manganese	Aquatic Life	Natural Sources**
		Phosphorus (Total)	Aquatic Life	Crop Production, Natural Sources**

Bold Causes of Impairment have numeric water quality standards and TMDLs will be developed. *Reduction goals established by Illinois EPA will be applied to Italicized Causes of Impairment.* *Other potential natural sources of low dissolved oxygen may include excessive algae, sediment oxygen demand, and/or lack of reaeration** Manganese is a mineral that naturally occurs in rocks and soil ***Natural sources of phosphorus in streams include sedimentation and erosion of nutrient-rich soils, atmospheric deposition, and direct input from animals

The TMDLs for the segment listed above will specify the following elements:

- Loading Capacity (LC) or the maximum amount of pollutant loading a water body can receive without violating water quality standards
- Waste Load Allocation (WLA) or the portion of the TMDL allocated to existing or future point sources
- Load Allocation (LA) or the portion of the TMDL allocated to existing or future nonpoint sources and natural background
- Margin of Safety (MOS) or an accounting of uncertainty about the relationship between pollutant loads and receiving water quality
- Reserve Capacity (RC) or a portion of the load explicitly set aside to account for growth in the watershed

These elements are combined into the following equation:

$$\mathbf{TMDL = LC = \Sigma WLA + \Sigma LA + MOS + RC}$$

The TMDLs will also consider the seasonal variability of pollutant loads so that applicable water quality standards are met during all seasons of the year. Also, reasonable assurance that the TMDLs and water quality goals will be achieved will be described in the WBP. The WBP for the Big Creek watershed will describe how water quality standards and goals will be met and attained. This WBP will include recommendations for implementing best management practices (BMPs), cost estimates, institutional needs to implement BMPs and controls throughout the watershed, and a timeframe for completion of implementation activities.

1.3 Report Overview

The remaining sections of this report contain:

- **Section 2 Big Creek Watershed Characteristics** provides a description of the watershed's location, topography, geology, land use, soils, population, and hydrology.
- **Section 3 Public Participation and Involvement** discusses public participation activities that will occur throughout TMDL development.
- **Section 4 Big Creek Watershed Water Quality Standards** defines the water quality standards and water quality guidelines for the impaired water bodies.

- **Section 5 Big Creek Watershed Data and Potential Pollutant Sources** presents the available water quality data needed to develop TMDLs and water quality goals, discusses the characteristics of the impaired stream segments in the watershed, and describes the point and nonpoint sources with potential to contribute to the watershed load.
- **Section 6 Approach to Developing TMDL and Identification of Data Needs** makes recommendations for the models and analysis that are needed for TMDL and WBP development and suggests segments for Stage 2 data collection.
- **Section 7 References**

Section 2

Big Creek Watershed Description

2.1 Big Creek Watershed Location

The Big Creek watershed (HUC 0512011211 - shown on Figure 1-1) is located in southeast Illinois and drains approximately 72,100 acres (112.7 square miles). Approximately 68,700 acres (95.3 percent of the total watershed) lie in Crawford County and 3,400 acres lie in Jasper County (4.7 percent of the total watershed).

2.2 Topography

Topography is an important factor in watershed management because stream types, precipitation, and soil types can vary significantly with elevation. National Elevation Dataset[1] (NED) coverages containing 30-meter grid resolution elevation data are available from the U.S. Geological Survey (USGS) for each 1:24,000-topographic quadrangle in the United States. Elevation data for the Big Creek watershed were obtained by overlaying the NED grid onto the geographic information system (GIS)-delineated watershed. **Figure 2-1** shows the elevations found within the watershed.

Elevation in the Big Creek watershed ranges from approximately 600 feet above sea level near the northeastern extent of the watershed to approximately 410 feet above sea level near the confluence of Big Creek and the Embarras River.

2.3 Land Use

Land use data for the Big Creek watershed were extracted from the U.S. Department of Agriculture's (USDA) National Agriculture Statistics Service (NASS) 2018 Cropland Data Layer[2] (CDL). The CDL is a raster based, geo-referenced, crop-specific land cover data layer created to provide acreage estimates to the Agricultural Statistics Board for the state's major commodities and to produce digital, crop-specific, categorized geo-referenced output products. This information is made available to all agencies and to the public free of charge and represents the most accurate and up-to-date land cover datasets available at a national scale. The most recent available CDL dataset was produced in 2018 and includes 22 separate land use classes applicable to the watershed. The available resolution of the land cover dataset is 30 square meters.

Land use characteristics of the Big Creek watershed were determined by overlaying the Illinois Statewide 2018 CDL onto the GIS-delineated watershed. **Table 2-1** contains the main categories of land uses contributing to the Big Creek watershed, based on the 2018 CDL land cover categories, and includes the area of each land cover category and percentage of the watershed

[1] https://catalog.data.gov/dataset/usgs-national-elevation-dataset-ned
[2] https://www.nass.usda.gov/Research_and_Science/Cropland/Release/index.php

area. **Figure 2-2** illustrates the land uses of the watershed. Appendix A contains a table of all land uses in the watershed.

Table 2-1 Land Cover and Land Use in the Big Creek Watershed

USDA/NASS Land Use Cropland Category	Acres	Percentage
Soybeans	27,021	37.7%
Corn	21,562	30.1%
Deciduous Forest	12,419	17.3%
Developed/Open Space	5,141	7.2%
Grass/Pasture	3,574	5.0%
Woody Wetlands	773	1.1%
Developed/Low Intensity	769	1.1%
Double Crop Winter Wheat/Soybeans	326	0.5%
Total	**71,585**	**100%**

The land cover data reveal that 48,909 acres, representing 68 percent of the total watershed area, are devoted to agricultural activities. Corn and soybean make up the vast majority of the agricultural land use within the watershed. Forests, woody wetlands, and grasslands cover 23 percent of the watershed (16,766 acres). Approximately 8 percent of the watershed area (5,910 acres) is developed, urbanized land.

2.3.1 Subbasin Land Use

The subbasin area draining to the impaired segment of Dogwood Creek (BEDB-01) was further delineated through GIS (see Figure 2-2). Land cover data was then intersected with the subbasin boundary to determine the land uses contributing runoff to the impaired waterbody, as shown in **Table 2-2**.

Table 2-2 Land Cover and Land Use in the Dogwood Creek (BEDB-01) Subbasin

Land Cover Category	Area (Acres)	Percentage
Soybeans	5,556	41.1%
Corn	3,946	29.2%
Deciduous Forest	1,625	12.0%
Developed/Open Space	1,222	9.0%
Grass/Pasture	774	5.7%
Developed/Low Intensity	240	1.8%
Woody Wetlands	101	0.7%
Double Crop Winter Wheat/Soybeans	58	0.4%
Total	**13,522**	**100%**

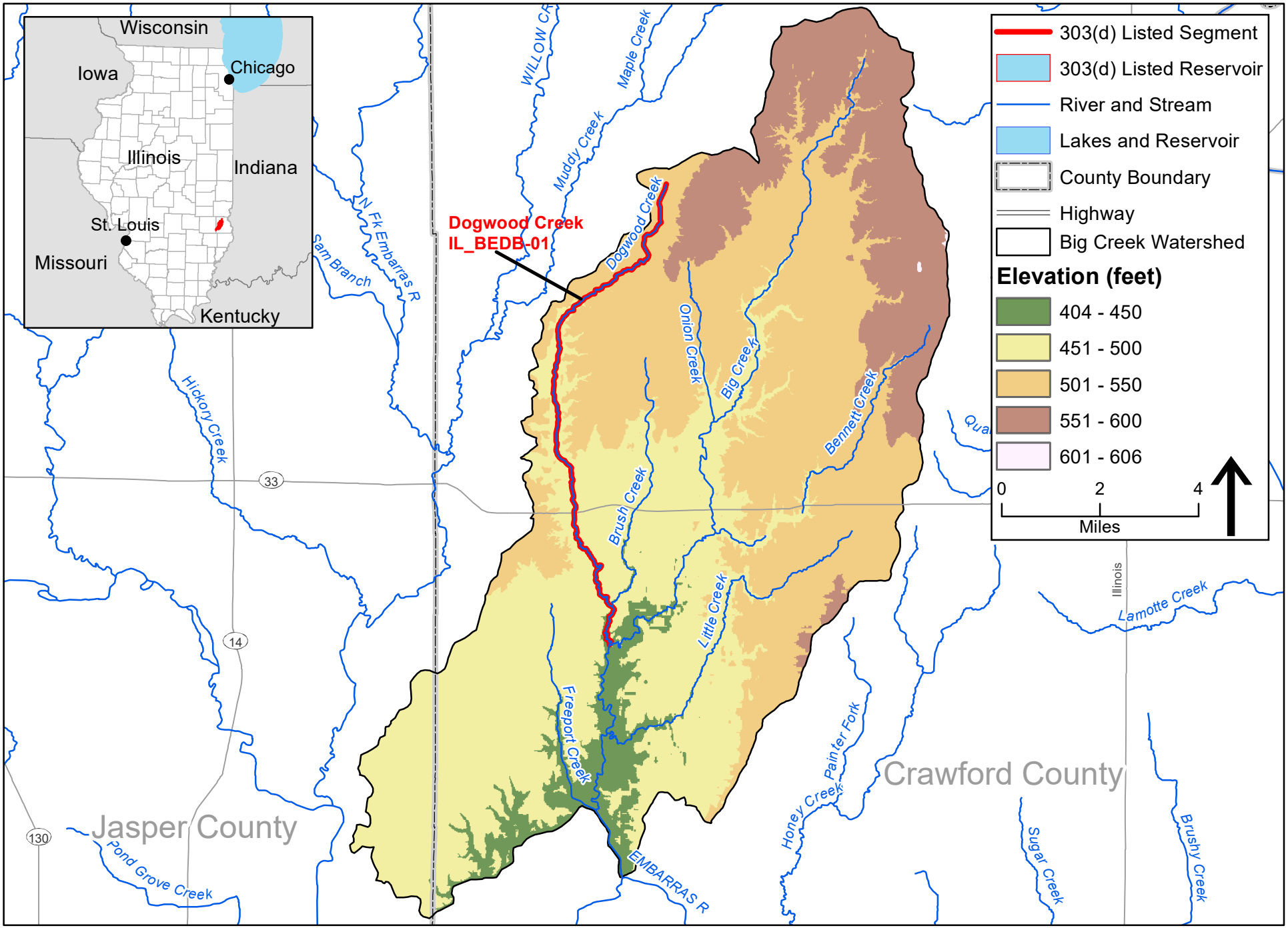

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Figure 2-1: Big Creek Watershed, Elevation

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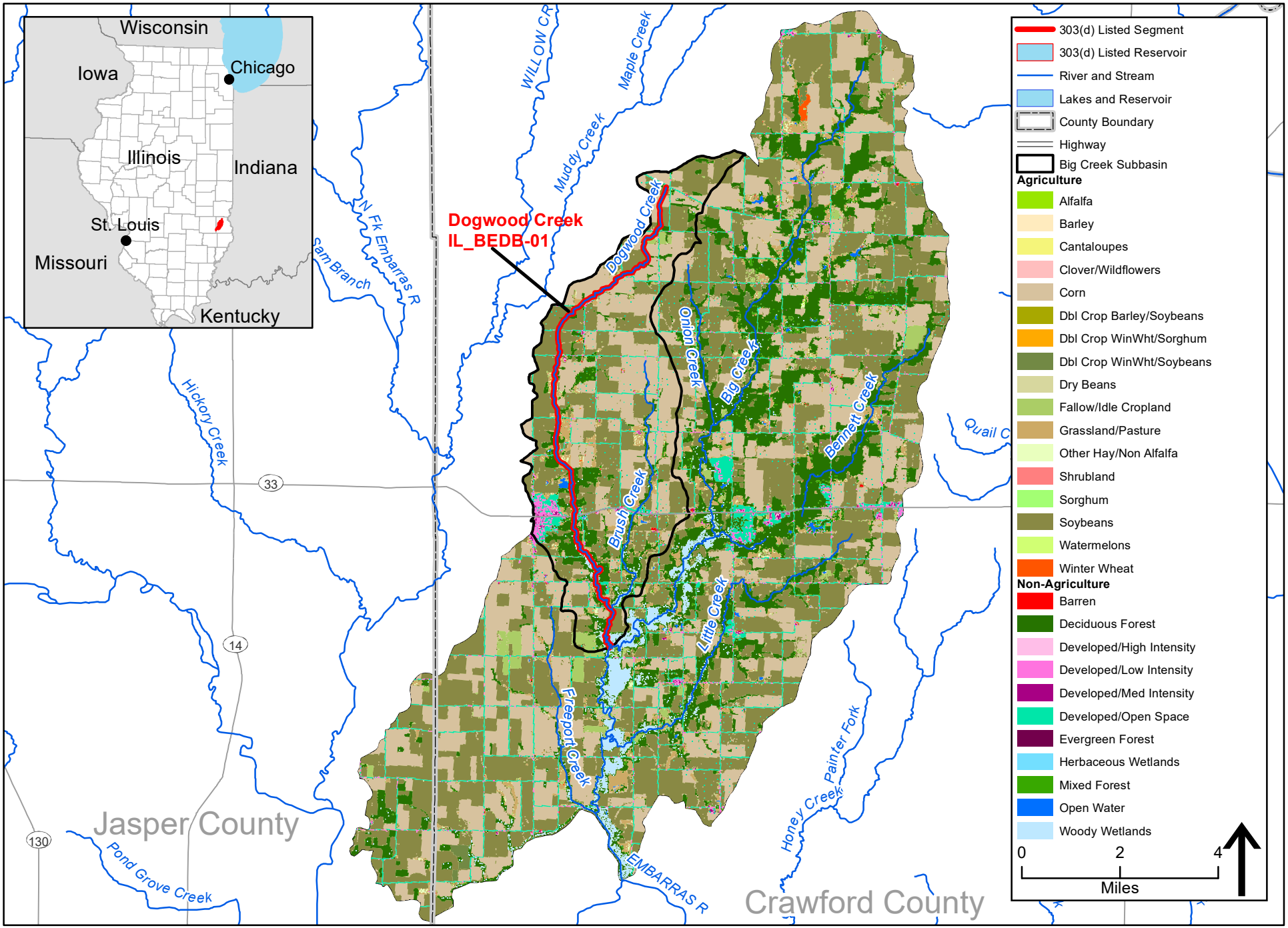

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Figure 2-2: Big Creek Watershed, Land Use

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2.4 Soils

Soils data are available through the Soil Survey Geographic (SSURGO) database[3]. For SSURGO data, field mapping methods using national standards are used to construct the soil maps. Mapping scales generally range from 1:12,000 to 1:63,360 making SSURGO the most detailed level of soil mapping done by the Natural Resources Conservation Service (NRCS).

Attributes of the spatial coverage can be linked to the SSURGO databases, which provide information on various chemical and physical soil characteristics for each map unit and soil series. Of particular interest for TMDL development are the hydrologic soil groups as well as the K-factor of the Universal Soil Loss Equation (USLE). The following sections describe and summarize the specified soil characteristics for the Big Creek watershed.

2.4.1 Big Creek Watershed Soil Characteristics

Appendix B contains a table of the SSURGO soil series for the Big Creek watershed. A total of 51 soil types exist in the watershed. The most common type—Cisne silt loam (0 to 2 percent slopes) – covers approximately 23 percent of the watershed. The other most common soil types – Bluford silt loam (0 to 2 percent slopes) and Wynoose silt loam (0 to 2 percent slopes) cover 20% and 14% of the watershed, respectively. All other individual soil types each represent less than 6 percent of the total watershed area. The table in Appendix B also contains the area, dominant hydrologic soil group, and k-factor range. Each of these characteristics is described in more detail in the following paragraphs.

Figure 2-3 shows the hydrologic soils groups found within the Big Creek watershed (NRCS 2007). Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms:

- Group A: Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil.
- Group B: Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded.
- Group C: Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.
- Group D: Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.

While hydrologic soil groups A, B, C, D, A/D, B/D, and C/D are all found within the Big Creek watershed, group C/D soils are by far the most common type representing 81 percent of the watershed. Group C/D is a dual hydrologic soil group. Dual hydrologic soil groups can be adequately drained. The first letter applies to the drained condition and the second letter to the

[3] https://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=IL

undrained condition. For the purpose of hydrologic soil group, adequately drained means that the seasonal high-water table is kept at 24 inches below the surface (NRCS 2007).

A commonly used soil attribute is the K-factor, which is a measure of soil erodibility and quantifies the relative susceptibility of soil to sheet and rill erosion. Values of K range from 0.02 to 0.64, from least erodible to most erodible, respectively, and are influenced by elements including texture, organic matter content, structure, and saturated hydraulic conductivity (NRCS 2011). The distribution of K-factor values in the Big Creek watershed range from 0.19 to 0.55, as shown in **Figure 2-4**.

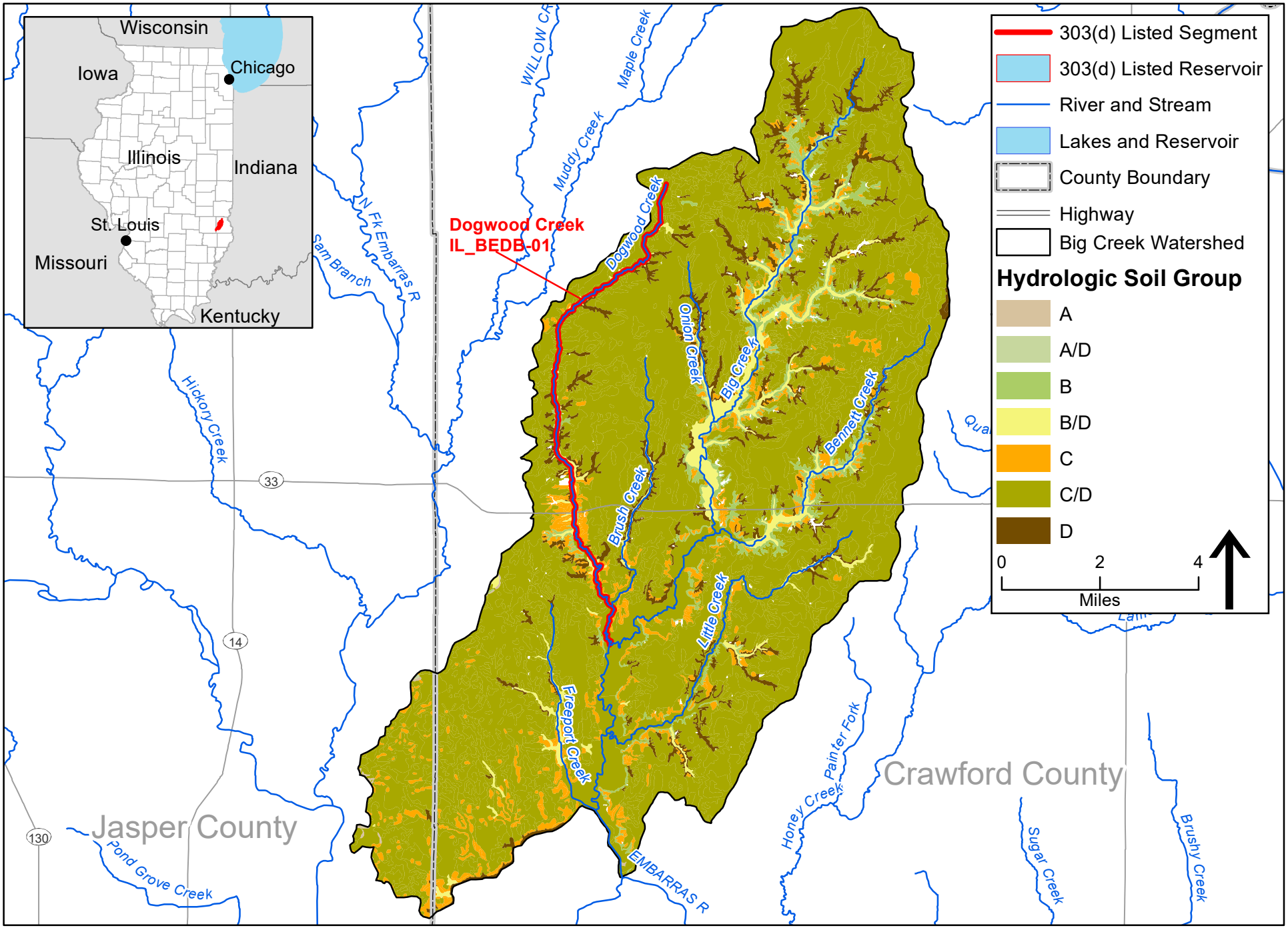

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Figure 2-3: Big Creek Watershed, Soils

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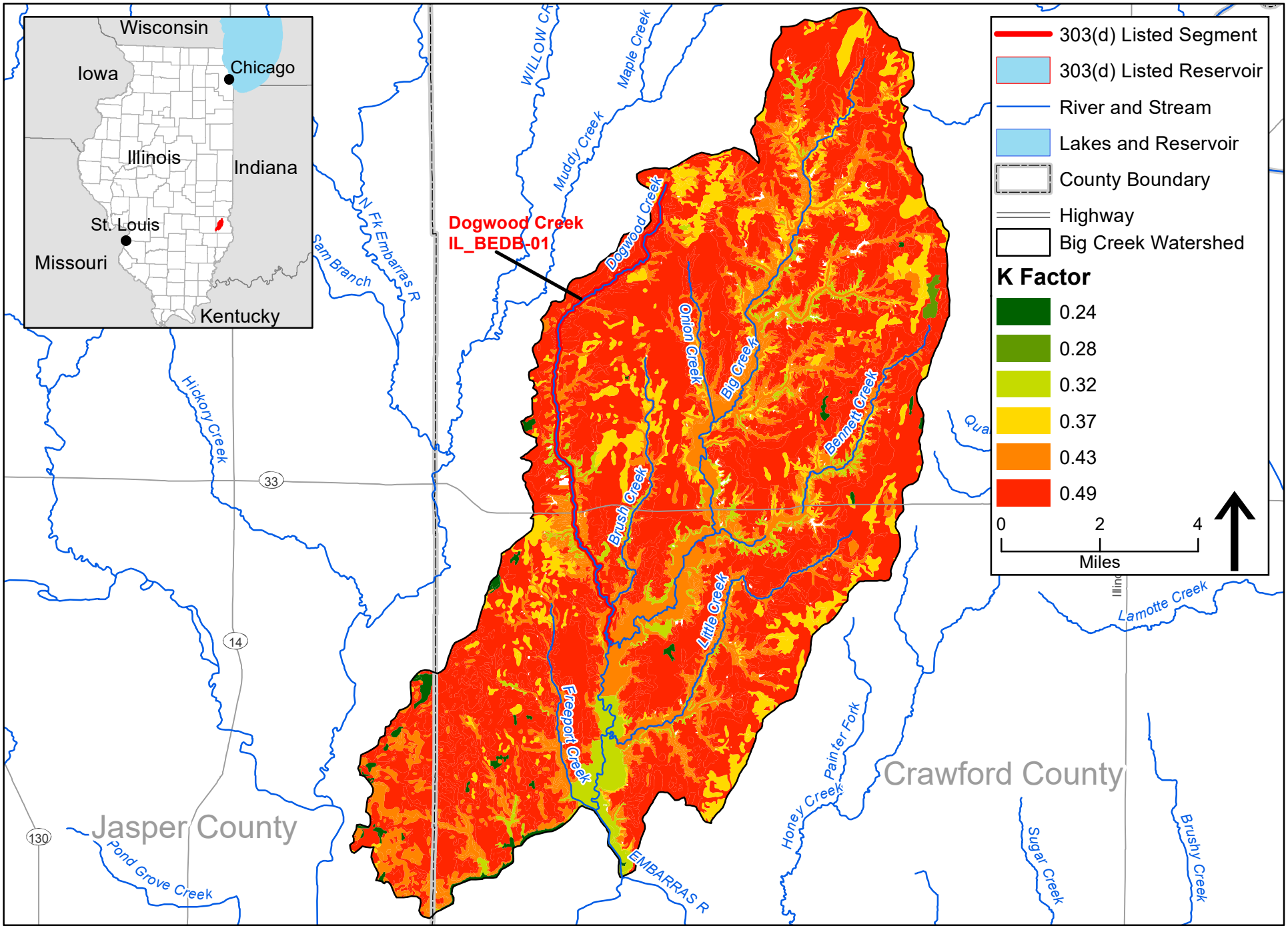

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Figure 2-4: Big Creek Watershed, K-Factor Ranges

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2.5 Population

Census 2015 TIGER/Line data[4] from the U.S. Census Bureau were retrieved for population information within the Big Creek watershed. Geographic shapefiles of census block groups[5] were downloaded for the entire state of Illinois. All census block groups that have geographic center points (centroids) within the watershed were selected and tallied in order to provide an estimate of populations in all census blocks both completely and partially contained by the watershed boundary. Given that the optimal size of a census block group is 1,500 people, and 4 block group centroids are located within the watershed, it is estimated that approximately 6,000 people reside in the Big Creek watershed. The municipalities in and around the watershed are shown in Figure 1-1. The largest urban development in the vicinity is the city of Robinson, most of which lies just to the east of the watershed, with a population of approximately 7,700.

2.6 Climate, Pan Evaporation, and Streamflow

2.6.1 Climate

Southeastern Illinois has a temperate climate with hot summers and cold, moderately snowy winters. Monthly temperature and precipitation data from Palestine, Illinois (Station ID USC00116558) were extracted from the National Climatic Data Center (NCDC) database[6] for the years 1893 through 2019. Although there are no climate stations located within the Big Creek watershed, this station is located less than 8 miles to the east and was selected due to its proximity to the watershed and completeness of its dataset. **Table 2-3** contains the average monthly precipitation along with average high and low temperatures for the period of record. The average annual precipitation is 42 inches. May and June are historically the wettest months while January and February are the driest. July is historically the warmest month, with an average maximum temperature of 89 °F, while January is typically the coldest month, with an average minimum temperature of 22 °F.

Table 2-3 Average Monthly Climate Data for Palestine, Illinois

Month	Average Total Precipitation (inches)	Average Daily Maximum Temperature (°F)	Average Daily Minimum Temperature (°F)
January	2.9	39.0	22.1
February	2.5	42.7	24.6
March	3.8	54.4	34.0
April	4.0	66.6	43.9
May	4.5	76.6	53.4
June	4.2	85.7	62.4
July	3.8	89.3	65.6
August	3.5	87.7	63.8
September	3.3	81.4	56.3
October	3.1	69.9	44.9
November	3.3	54.4	34.6
December	3.0	42.3	25.8
Total	**41.9**	**65.8**	**44.3**

[4] https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html
[5] https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-block-maps.html
[6] https://www.ncdc.noaa.gov/cdo-web/datatools/findstation

2.6.2 Streamflow

Analysis of the Big Creek watershed requires an understanding of flow throughout the drainage area. There is only one USGS stream gage in the watershed, however, data at this gage is limited to two data points from 1975 (USGS 2019). **Table 2-4** summarizes the station information, as well as information for two additional nearby gages.

Table 2-4 Streamflow Gages in the Big Creek Watershed[7]

Gage Number	Name	Available Data	POR
03346150	Big Creek near Oblong, IL	Discharge	1975
03345500	Embarras River at Ste. Marie, IL	Discharge, Gage Height	1922-2019
03346000	North Fort Embarras River near Oblong, IL	Discharge, Gage Height	1941-2019

There are two USGS gages in a watershed adjacent to Big Creek (**Figure 2-5**). USGS gage 03345500 (Embarras River at Ste. Marie, IL) is located approximately 3 miles west of the Big Creek watershed and has a drainage area of 1,516 square miles. USGS gage 03346000 (North Fork Embarras River near Oblong, IL) is the second gage that is adjacent to the Big Creek watershed. This gage is located approximately 2 miles west of the watershed and drains 318 square miles. This adjacent watershed is similar in size to the Big Creek watershed and likely has similar runoff and streamflow.

The latter USGS gage (03346000 North Fork Embarras River near Oblong, IL), given its location adjacent to the Big Creek watershed and its similarity in size, may be used to estimate flow values during Stage 3 TMDL development for Dogwood Creek using the drainage area ratio method, represented by the following equation:

$$Q_{gaged}\left(\frac{Area_{ungaged}}{Area_{gaged}}\right) = Q_{ungaged}$$

where Q_{gaged} = Streamflow of the gaged basin
$Q_{ungaged}$ = Streamflow of the ungaged basin
$Area_{gaged}$ = Area of the gaged basin
$Area_{ungaged}$ = Area of the ungaged basin

The assumption behind the equation is that the flow per unit area is equivalent in watersheds with similar characteristics. Therefore, the flow per unit area in the gaged watershed multiplied by the area of the ungaged watershed estimates the flow for the ungaged watershed.

Data downloaded through the USGS for the surrogate gage for the available period of record will be adjusted to account for point source influence in the watershed upstream of the gaging station. Average daily flows from all National Pollutant Discharge Elimination System (NPDES) permitted facilities upstream of the surrogate USGS gages are subtracted from the gaged flow prior to flow-per-unit-area calculations. The resulting estimates account for flows associated with precipitation and overland runoff only. Average daily flows from permitted NPDES

[7] https://waterdata.usgs.gov/IL/nwis/current/?type=dailydischarge&group_key=basin_cd

discharges upstream of the impaired segments in the Big Creek watershed can then be added back into the equation to more accurately reflect estimated daily streamflow conditions in a given segment.

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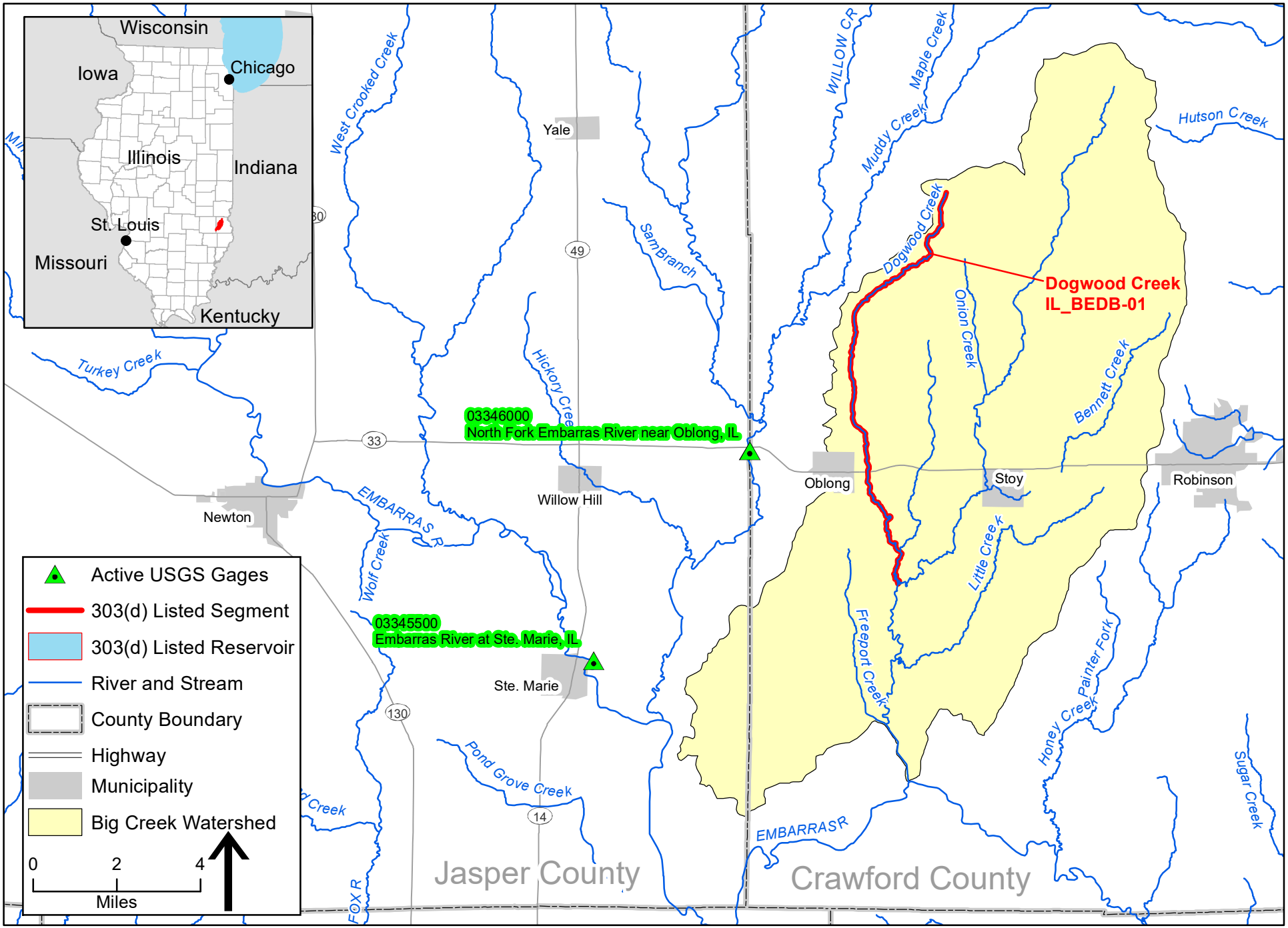

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Figure 2-5: Big Creek Watershed, Active USGS Gages

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Section 3

Big Creek Watershed Public Participation

3.1 Big Creek Watershed Public Participation and Involvement

Public knowledge, acceptance, and follow-through are necessary to implement a plan to meet recommended TMDLs and WBPs. It is important to involve the public as early in the process as possible to achieve maximum cooperation and counter concerns as to the purpose of the process and the regulatory authority to implement any recommendations.

Illinois EPA, along with CDM Smith, will hold a public meeting in the Big Creek watershed at the completion of Stages 1 and 3. Comments received through the public meeting process will be included in an appendix. This section will be updated following each public meeting.

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Section 4

Big Creek Watershed Water Quality Standards

4.1 Illinois Water Quality Standards

Water quality standards are developed and enforced by the state to protect the "designated uses" of the state's waterways. In the state of Illinois, setting the water quality standards is the responsibility of the Illinois Pollution Control Board (IPCB). Illinois is required to update water quality standards every three years in accordance with the CWA. The standards requiring modifications are identified and prioritized by the Illinois EPA, in conjunction with USEPA. New standards are then developed or revised during the three-year period.

Illinois EPA is also responsible for developing scientifically based water quality criteria and proposing them to the IPCB for adoption into state rules and regulations. The Illinois water quality standards are established in the Illinois Administrative Rules Title 35, Environmental Protection; Subtitle C, Water Pollution; Chapter I, Pollution Control Board; Part 302, Water Quality Standards[1].

4.2 Designated Uses

The waters of Illinois are classified into four primary categories of narrative and numeric water quality standards for surface waters, which include: General Use Standards, Public and Food Processing Water Supply Standards, Secondary Contact and Indigenous Aquatic Life Standards, and Lake Michigan Basin Water Quality Standards[2]. Segment BEDB-01 of Dogwood Creek is on the 303(d) list for impairment of the aquatic life use (under the General Use Standards) by low dissolved oxygen (DO), elevated dissolved manganese, and total phosphorus.

4.2.1 General Use

The General Use classification is defined by IPCB as standards that "are intended to protect aquatic life, wildlife, agricultural, primary contact, secondary contact, and most industrial uses." They are also intended to "ensure the aesthetic quality of the state's aquatic environment and to protect human health from disease or other harmful effects that could occur from ingesting aquatic organisms taken from surface waters of the state."

4.3 Water Quality Criteria

According to the Illinois EPA Integrated Report[2], aquatic life use assessments in streams are typically based on the interpretation of biological information, physiochemical water data, and physical habitat. The primary biological measures used are the fish Index of Biotic Integrity (fIBI), the macroinvertebrate Index of Biotic Integrity (mIBI), and the Macroinvertebrate Biotic Index (MBI). Physical habitat information used in assessments includes quantitative and qualitative measures of stream bottom composition and qualitative descriptors of channel and riparian conditions. Physiochemical water data used include

[1] http://www.ilga.gov/commission/jcar/admincode/035/03500302sections.html
[2] 303d list - Total Maximum Daily Loads (illinois.gov)

measures of "conventional" parameters (e.g. DO, pH, and temperature), priority pollutants, non-priority pollutants, and other pollutants.

Table 4-1 presents the numeric water quality standards of the potential causes of impairment for segment BEDB-01 of Dogwood Creek in the Big Creek watershed. Only constituents with numeric water quality standards will have TMDLs developed at this time.

Table 4-1 Summary of Numeric Water Quality Standards for Potential Causes of Stream Impairments in the Big Creek Watershed

Parameter	Units	General Use Water Quality Standard	Regulatory Reference[1]
Dissolved Oxygen	mg/L	*March through July* ≥5.0 minimum & ≥6.0 7-day daily mean averaged over 7 days *August through February* ≥3.5 minimum, ≥4.0 7-day minimum averaged over 7 days & ≥5.5 30-day daily mean[1]	302.206(b)
Manganese (dissolved)	µg/L	Acute = $e^{A+B\ln(H)}$ X 0.9812* where A = 4.9187 and B = 0.7467 Chronic = $e^{A+B\ln(H)}$ X 0.9812* where A = 4.0635 and B = 0.7467	302.208(e)

µg/L = micrograms per liter
H = hardness
* = Conversion factor multiplier for dissolved metals
[1]302.206(d) provides further information on detailed calculations for determining the acute and chronic standards for DO

4.4 Illinois Nutrient Loss Reduction Strategy

In addition to the water quality standards provided above, the Illinois EPA has also established water quality guidelines for nutrients in accordance with the Illinois Nutrient Loss Reduction Strategy (NLRS)[3]. The NLRS was developed in response to hypoxia in the Gulf of Mexico and all 12 states within the Mississippi River Basin were called upon by the USEPA to reduce nutrient loads flowing into the Mississippi River. Water quality goals will be incorporated into the WBPs based on the NLRS, which calls for an overall 45% load reduction of total phosphorus leaving the state of Illinois, and an interim target of 25% load reduction by 2025. A WBP will be developed using the interim total phosphorus load reduction goal of 25%. The WBP for the Big Creek watershed will include a comprehensive suite of best management practices (BMPs) for reducing loads from identified watershed sources.

4.5 Potential Pollutant Sources

In order to properly address the conditions within the Big Creek watershed, potential pollutant sources must be investigated for TMDL pollutants. **Table 4-2** summarizes the potential sources associated with the impairments for the 303(d) listed segment in this watershed.

[3] https://www2.illinois.gov/sites/agr/Resources/NutrientLoss/Pages/default.aspx

Table 4-2 Potential Sources of 303(d) Impairment in the Big Creek Watershed

Segment ID	Segment Name	Potential Causes of Impairment	Designated Use	Potential Sources (as identified by the 2018 303(d) list)
BEDB-01	Dogwood Creek	**Dissolved Oxygen**	Aquatic Life	Crop Production (Crop Land or Dry Land), Sources Unknown
		Manganese	Aquatic Life	Natural Sources**
		Phosphorus (Total)	Aquatic Life	Crop Production (Crop Land or Dry Land), Natural Sources***

Bold Causes of Impairment have numeric water quality standards and TMDLs will be developed. *Reduction goals established by Illinois EPA will be applied to Italicized Causes of Impairment.* *Other potential natural sources of low dissolved oxygen may include excessive algae, sediment oxygen demand, and/or lack of reaeration** Manganese is a mineral that naturally occurs in rocks and soil ***Natural sources of phosphorus in streams include sedimentation and erosion of nutrient-rich soils, atmospheric deposition, and direct input from animals

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Section 5

Big Creek Watershed Data and Potential Pollution Sources

In order to further characterize the Big Creek watershed (HUC 0512011211), a wide range of pertinent data were collected and reviewed. Water quality data for streams, and information on potential point and nonpoint sources within the watershed, were compiled from a variety of data sources. This information is presented and discussed in further detail in the remainder of this section.

5.1 Water Quality Data

Illinois EPA monitoring programs that contribute data to the assessment of streams include the Ambient Water Quality Monitoring Network, the Pesticide Monitoring Subnetwork, Facility-Related Stream Surveys, Intensive Basin Surveys, and the Fish Contaminant Monitoring Program[1]. The data used for this report came from Intensive Basin Surveys. Intensive Basin Surveys are typically conducted on a 5-year cycle and focus on basins where intensive data are currently lacking or where historical data need updating. Intensive Basins Surveys were conducted in the Big Creek watershed in 2006, 2011, and 2016. Additional information on Illinois EPA's monitoring programs can be found in the "Illinois Water Monitoring Strategy[2]."

Data from two water quality stations on the impaired stream within the Big Creek watershed were located and reviewed for this report. These water quality data were provided by the Illinois EPA. **Figure 5-1** shows the water quality data stations within the watershed that contain data relevant to the impaired segment (Dogwood Creek).

5.1.1 Stream Water Quality Data

One impaired stream segment exists within the Big Creek watershed, Dogwood Creek segment BEDB-01. Data presented below relate to the parameters of concern that currently have numeric criteria as well as those with water quality goals designed to address narrative standards. As presented in Section 4.3, dissolved oxygen and dissolved manganese have numeric criteria and impairment determinations can be confirmed through comparison to available historical data. Total phosphorus does not have numeric criteria for streams so impairment confirmation is not possible based on water quality data alone. Historical total phosphorus concentrations are presented in this section for reference and will be used to calculate the concentration and loads needed to meet the interim target goal of 25% load reduction by 2025 as presented in Section 4.4. All historical water quality data available for the impaired segment of the Big Creek watershed are available in Appendix C.

[1] https://www2.illinois.gov/epa/topics/water-quality/monitoring/Pages/river-and-stream.aspx
[2] https://www2.illinois.gov/epa/Documents/epa.state.il.us/water/water-quality/monitoring-strategy/monitoring-strategy-2015-2020.pdf

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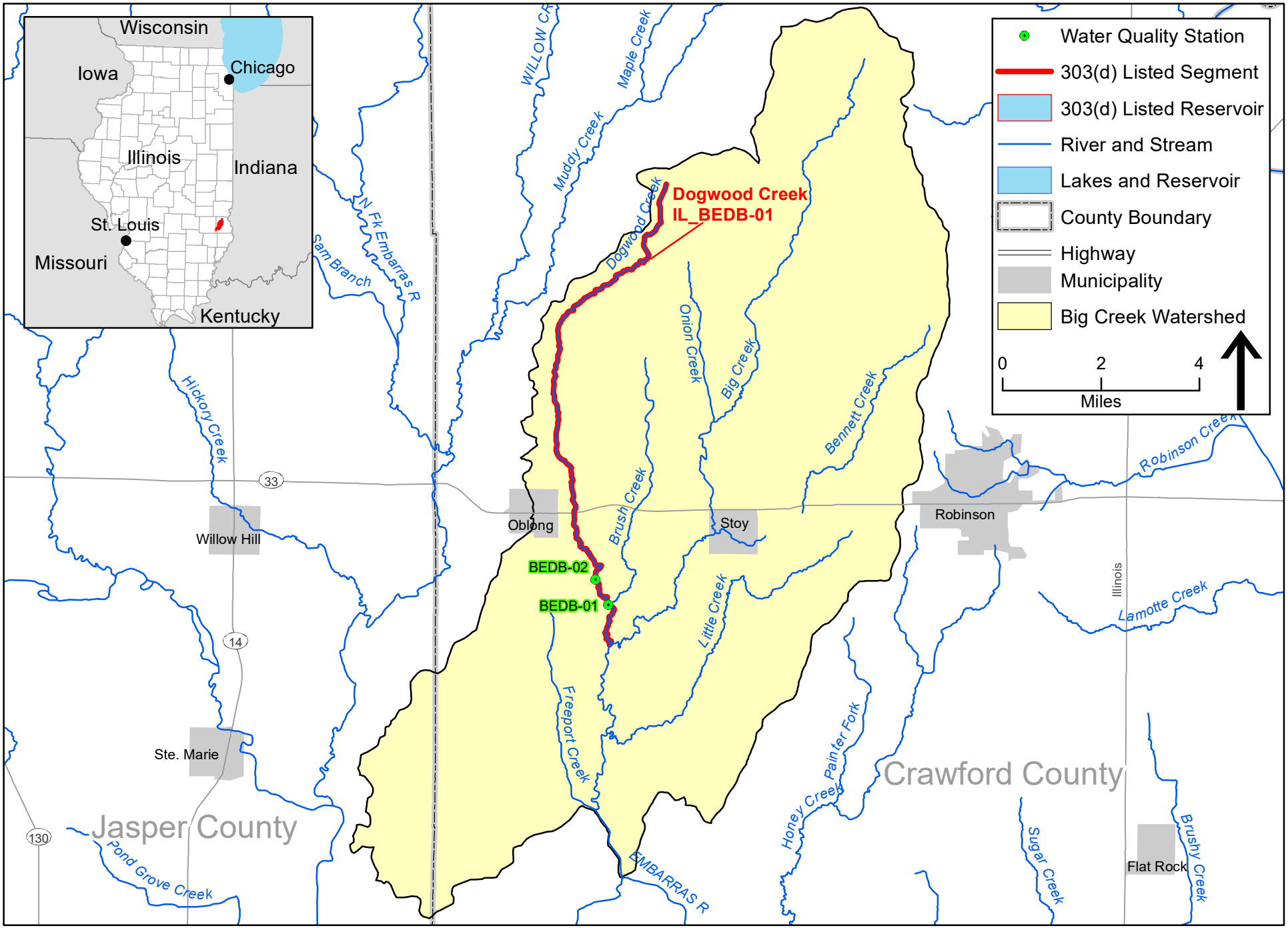

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Figure 5-1: Big Creek Watershed, Water Quality Stations

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5.1.1.1 Dissolved Oxygen

Dogwood Creek segment BEDB-01 is listed for impairment of the aquatic life use caused by low DO concentrations. **Table 5-1** summarizes available historical DO data on this segment from water quality stations BEDB-01 and BEDB-02. The general use water quality standard for DO provides seasonal instantaneous minima and minimum weekly (7-day) average concentrations in streams. Due to the limited dataset, only the instantaneous minimum standards of 5.0 mg/L for March through July and 3.5 mg/L for August through February were used to confirm historical exceedances of the standard. The data presented in Table 5-1 reflect single measurements from the segment compared to the applicable seasonal standard at the time of the field measurement.

Table 5-1 Existing Dissolved Oxygen Data for Dogwood Creek segment BEDB-01

Illinois WQ Standard (mg/L)	Period of Record and Number of Data Points	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Number of Exceedances	Sample Locations
5.0[(1)], 3.5[(2)]	2006-2016; 7	3.7	6.4	0.3	3	BEDB-01, BEDB-02

[(1)] Instantaneous Minimum *March-July*
[(2)] Instantaneous Minimum *August-February*

The summary of data presented in Table 5-1 reflects single samples from the impaired segment compared to the standard during the appropriate months. Three exceedances were noted in the available dataset for Dogwood Creek, using data from sampling locations BEDB-01 and BEDB-02, representing 43 percent of available DO measurements. **Figure 5-2** shows the DO measurements collected over time from the impaired segment.

Historical DO sampling occurred between May and October. Stream flows are typically higher in spring and at the beginning of the summer when the 5.0 mg/L standard applies, and lower towards late summer and fall when the 3.5 mg/L standard applies. Data fell below the seasonal minima during both seasons. Note that data from the most recent Intensive Basin Survey (2016) did not violate the DO standard.

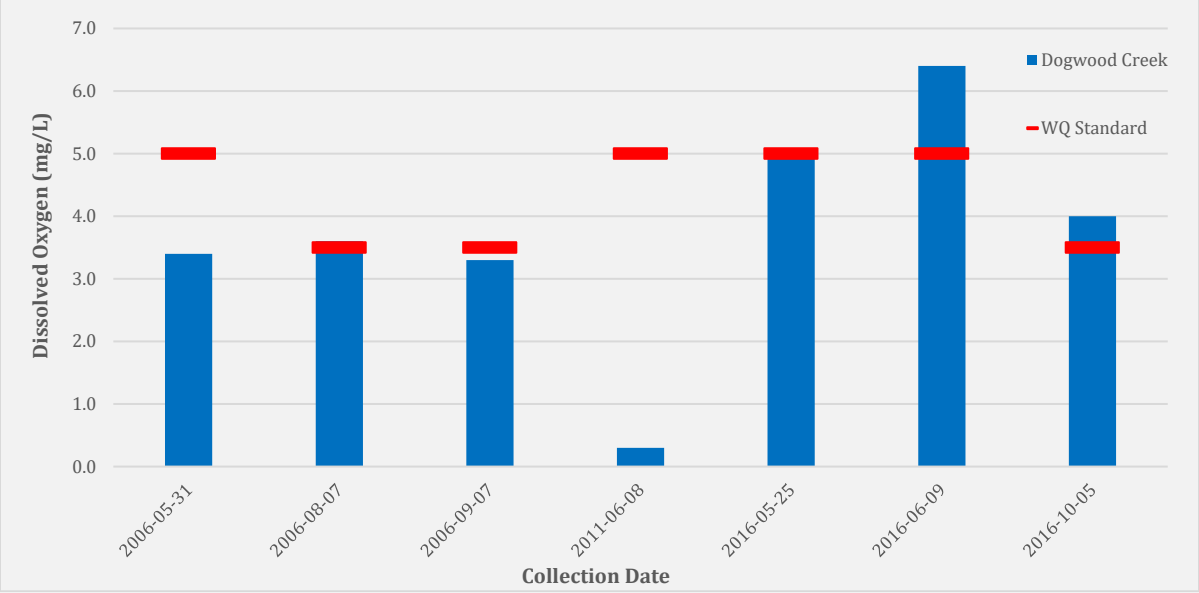

Figure 5-2: DO measurements and instantaneous minimum water quality standards for Dogwood Creek

5.1.1.2 Dissolved Manganese

Dogwood Creek segment BEDB-01 is listed for impairment of aquatic life use caused by elevated dissolved manganese concentrations. **Table 5-2** summarizes the available historical dissolved manganese data for this segment. Both the acute and chronic general use water quality standards for dissolved manganese are calculated standards that vary with the total hardness of the sampled water.

Table 5-2 Existing Dissolved Manganese Data for Dogwood Creek segment BEDB-01

Illinois WQ Standard (µg/L)	Period of Record and Number of Data Points	Mean (µg/L)	Maximum (µg/L)	Minimum (µg/L)	Number of Exceedances	Sample Locations
*Hardness-dependent(1)	2006-2016; 9	881	2000	395	0	BEDB-01, BEDB-02

The summary of data presented in Table 5-2 reflects single samples from the impaired segment compared to the hardness-dependent standard. No exceedances were noted in the available dataset for Dogwood Creek. **Figure 5-3** shows the dissolved manganese measurements collected over time at the impaired segment.

The lack of reported exceedances suggests that this segment was assessed as impaired due to elevated manganese concentrations based on a previous water quality standard for manganese. Prior to 2012, the applicable water quality standard for manganese to protect aquatic life used in Illinois was 1,000 ug/L of total manganese. This standard has since been replaced by the current hardness-dependent standards developed for the dissolved fraction of manganese in water. A review of the historical data confirms that total manganese concentrations above 1,000 ug/L were collected on the segment in 2006 and 2011. The lack of reported exceedances of the current applicable standard for dissolved manganese in Dogwood Creek suggests that removal of this impairment from the Illinois 303(d) list may be warranted.

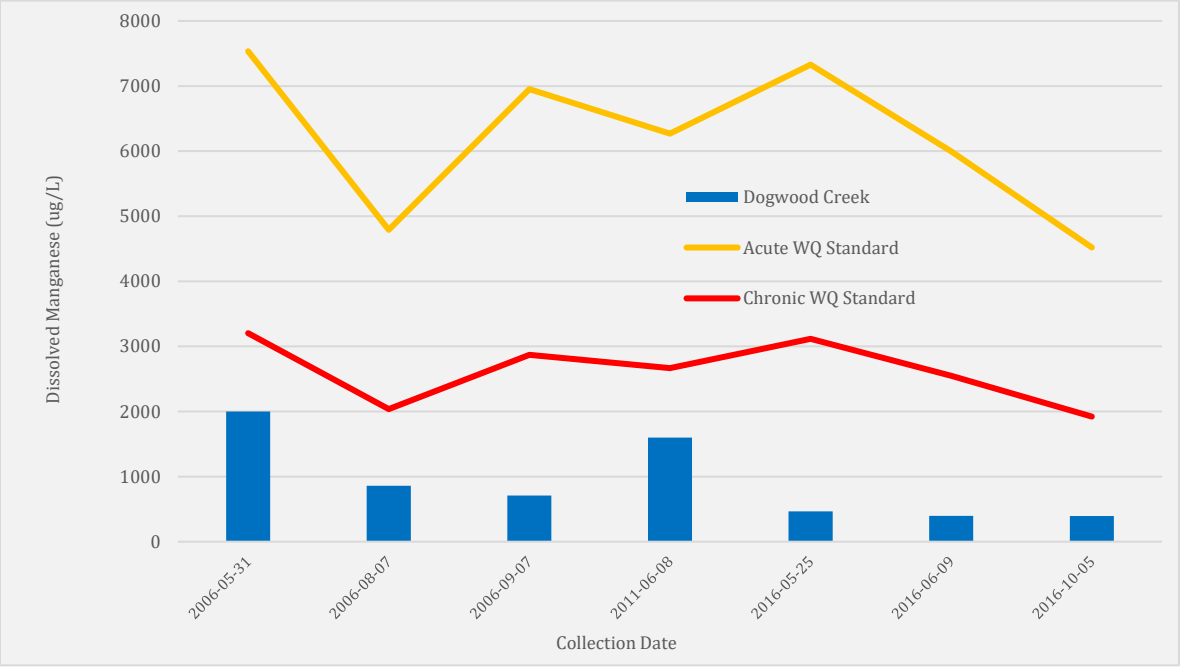

Figure 5-3: Dissolved Manganese data and water quality standards for Dogwood Creek

5.1.1.3 Total Phosphorus

Dogwood Creek segment BEDB-01 is listed for impairment of the aquatic life use due to elevated total phosphorus concentrations. **Table 5-3** summarizes historical phosphorus data collected on the impaired segment. **Figure 5-4** shows the total phosphorus measurements collected over time at the impaired segment. Figure 5-4 shows that total phosphorus concentrations have historically been highest during late summer/early fall. This is typically also at the end of the agricultural growing season and during low stream flows.

Table 5-3 Existing Total Phosphorus Data for Dogwood Creek segment BEDB-01

Illinois WQ Goal (mg/L)	Period of Record and Number of Data Points	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Sample Locations
25% reduction of load	2006-2016; 12	0.66	1.44	0.33	BEDB-01, BEDB-02

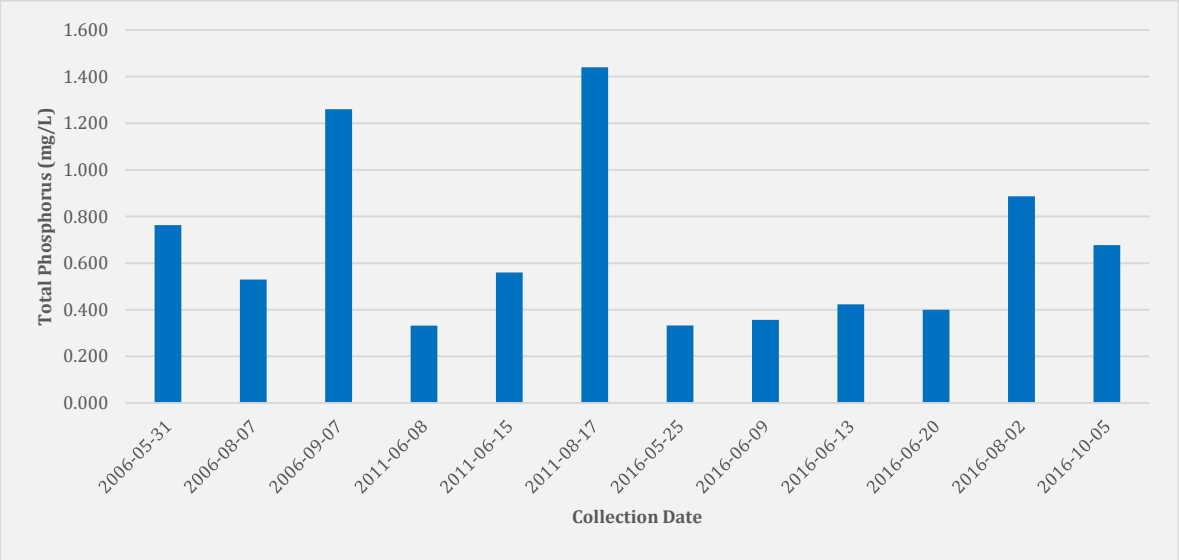

Figure 5-4: Total Phosphorus data for Dogwood Creek

5.2 Point Sources

In general, facilities discharging treated domestic wastewater have the potential to affect DO concentrations (through the discharge of nutrients and other oxygen-demanding materials) and nutrient levels in their receiving waters. There is one NPDES wastewater facility that discharges to Dogwood Creek within the Big Creek watershed (**Figure 5-5**). **Table 5-4** contains permit information from the general permit for The Village of Oblong Wastewater Treatment Facility (WWTF).

Table 5-4 Facility Information for Village of Oblong[3]

Facility ID	Facility Name	Design Average/Design Maximum Flow (mgd)	Reported Average Flow (mgd)	Parameters Monitored Under Permit	Receiving Water
ILG582017	Village of Oblong WWTF	0.4/1	0.32	Flow, CBOD5, Ammonia, DO, TSS, pH, chlorine	Dogwood Creek

[3] https://echo.epa.gov/trends/loading-tool/reports/dmr-pollutant-loading?year=2020&permit_id=ILG582017

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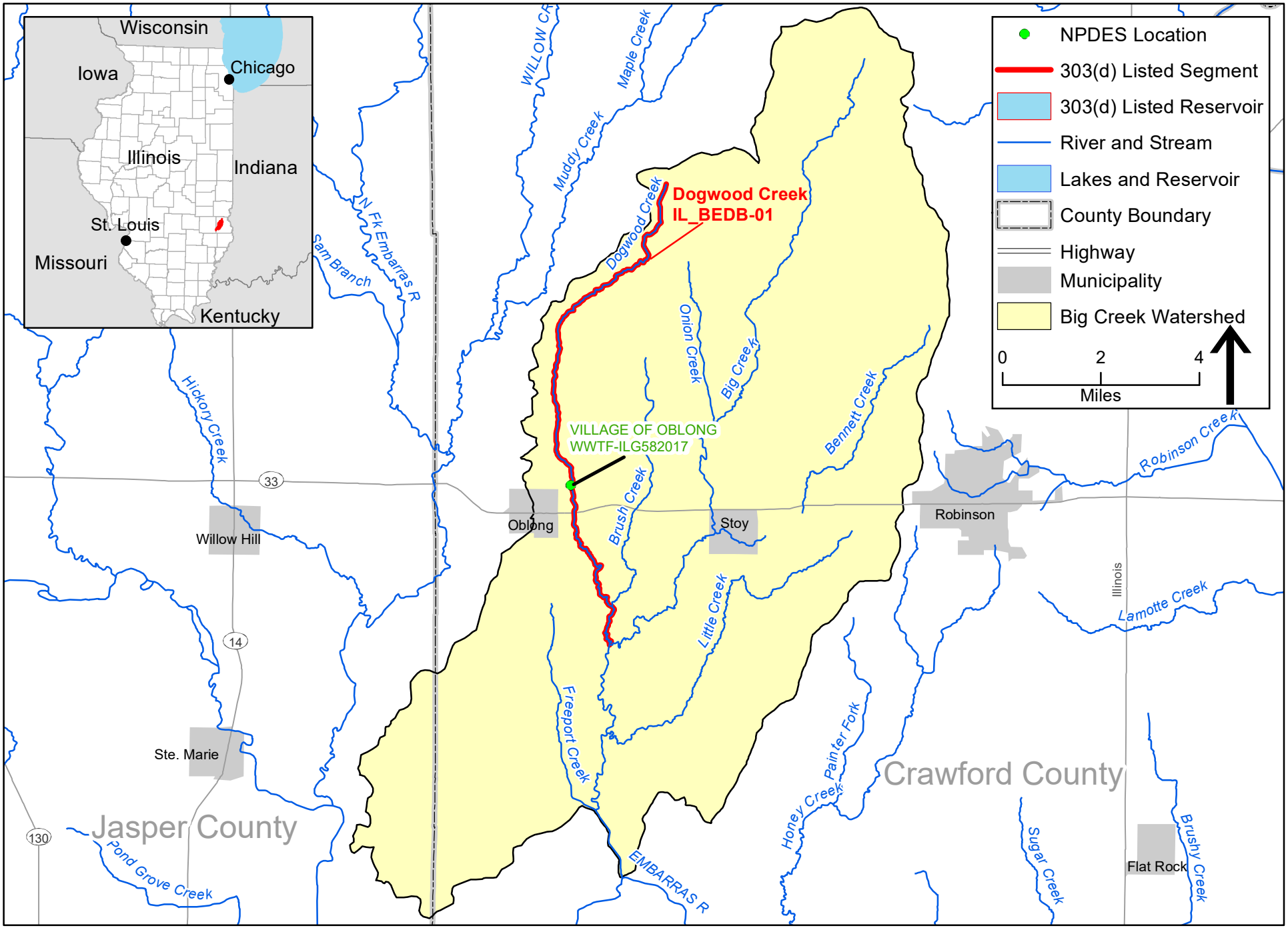

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Figure 5-X: Big Creek Watershed, NPDES Location

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5.3 Nonpoint Sources

There are a number of potential nonpoint sources of pollutant loading to the impaired segment in the Big Creek watershed. The 303(d) list included "natural sources" and "crop production" as potential sources of impairment within the watershed. This section will discuss site-specific cropping practices, animal operations, and area septic systems and how they relate to the parameters of concern in Dogwood Creek. Data were collected through communications with the local NRCS, Illinois Soil and Water Conservation Districts (SWCDs), and county health departments.

5.3.1 Crop Information

Nearly 70 percent of the lands within the Big Creek watershed and the Dogwood Creek subbasin are devoted to agriculture. Because much of the watershed is under cultivation, soil loss from fields is likely the primary source of any pollutant attached to the sediment (nutrients and potentially naturally occurring metals). Tillage practices for crops such as corn, soybeans, and grains can be categorized as conventional till, reduced till, mulch till, and no till. The percentage of each tillage practice for corn, soybeans, and small grains by county are generated from County Transect Surveys by the Illinois Department of Agriculture[4]. Data are presented in **Tables 5-5** and **5-6** for Crawford and Jasper counties, respectively.

Table 5-5 Tillage Practices in Crawford County, Illinois

Tillage System	Corn		Soybean		Small Grain	
	2015	2018	2015	2018	2015	2018*
Conventional	86.4%	60.3%	40.6%	26.2%	18.2%	0.0%
Reduced - Till	9.5%	9.5%	23.6%	46.2%	0.0%	0.0%
Mulch – Till	3.0%	30.2%	20.1%	11.6%	0.0%	0.0%
No - Till	1.1%	0.0%	15.7%	16.0%	81.8%	11.1%

*While totals for 2018 small grain tillage do not add up to 100%, values shown are as reported by the Department of Agriculture.

Table 5-6 Tillage Practices in Jasper County, Illinois

Tillage System	Corn		Soybean		Small Grain	
	2015	2018	2015	2018	2015	2018
Conventional	77.7%	86.7%	16.2%	23.4%	0.0%	0.0%
Reduced - Till	12.6%	3.3%	28.9%	29.4%	0.0%	10.0%
Mulch – Till	2.9%	1.8%	34.2%	22.0%	44.4%	10.0%
No - Till	6.8%	8.1%	20.8%	25.2%	55.6%	80.0%

According to the County Transect Survey summary report, fields planted conventionally leave less than 15% of the soil surface covered with crop residue after planting, while mulch-till leaves at least 30% of the residue from the previous crop remaining on the soil surface after being tilled and planted. Reduced-till falls between conventional and mulch (greater than 15% but less than 30%) and no-till practices leave the soil virtually undisturbed from harvest through planting. Residue is important because it shields the ground from the eroding effects of rain and helps retain moisture for crops.

Information on field tiling practices was also sought as field drains can influence the timing and amount of water delivered to area streams and reservoirs, as well as deliver dissolved

[4] https://www.agr.state.il.us/illinois-soil-conservation-transect-survey-reports

nutrients from fields to receiving waters. Local NRCS officials reported, however, that tile drainage is very rare within the watershed[5].

5.3.2 Animal Operations

Information on animal operations is available from the NASS. Knowing the number of animal units in a watershed is useful in TMDL development as grazing animals have the potential to increase erosion and contribute nutrients through manure. Although watershed-specific data are not available, countywide data for Crawford and Jasper counties are presented in **Tables 5-7** and **5-8**, respectively[6].

Table 5-7 Crawford County Animal Population

Livestock Type	2012	2017	Percent Change
Cattle and Calves	2,556	2,196	-14.1%
Beef	(D)	1,332	--
Dairy	(D)	5	--
Hogs and Pigs	11,420	19,903	74.3%
Poultry	512	388	-24.2%
Sheep and Lambs	200	486	143.0%
Horses and Ponies	397*	248	-37.5%

(D) – Withheld to avoid disclosing data for individual farms
*USDA 2012

Table 5-8 Jasper County Animal Population

Livestock Type	2012	2017	Percent Change
Cattle and Calves	10,252	11,126	8.5%
Beef	2,669	2,866	7.4%
Dairy	1,799	1,463	-18.7%
Hogs and Pigs	184,432	177,878	-3.6%
Poultry	785	773	-1.5%
Sheep and Lambs	43	182	323.3%
Horses and Ponies	325*	291	-10.5%

*USDA 2012

The tables above show significant hog and pig populations within the watershed counties. There are no known concentrated animal feeding operations (CAFOs) within the watershed and communications with local NRCS officials have indicated that livestock is generally rare within the boundaries of the Big Creek watershed[7].

5.3.3 Septic Systems

Most households in rural areas of Illinois that are not connected to municipal sewers make use of onsite sewage disposal systems, or septic systems. There are several types of septic systems, but the most common septic system is composed of a septic tank draining to a septic field, where nutrient removal occurs. However, the degree of nutrient removal is limited by local soils and the extent of system upkeep and maintenance. Across the U.S., septic systems have been found to be a significant source of phosphorus pollution.

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[5] Klingler, L. 2019, November 11. Natural Resource Conservation Service (NRCS) - Crawford County, District Conservationist. Email correspondence.

[6] https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Illinois/

[7] Klingler, L. 2019, November 11. Natural Resource Conservation Service (NRCS) - Crawford County, District Conservationist. Email correspondence.

Information on the extent of septic use in the Big Creek watershed was obtained from the Crawford County Health Department. Health department officials stated that many county residents within the watershed rely on private septic systems and estimated that approximately 87,600,000 – 104,025,000 gallons of water per year may be discharging into a natural drainage area within the watershed from septic systems[8]. In addition, septic use density is primarily consolidated along the main stem of Big Creek[9].

5.4 Watershed Studies and Other Watershed Information

Previous efforts completed within the watershed are discussed below, although it is assumed that more information will become available through public meetings within the watershed community. In the event that other watershed-specific information becomes available, it will be reviewed, and all applicable data will be incorporated during Stages 2 and 3 of TMDL development.

2011 – The Embarras River Watershed Management Plan was developed by the City of Charleston, Illinois and the Embarras River Management Association and was created to update a similar plan that was written in 1996 to work towards restoring waters impaired by nonpoint sources of pollution. The Plan includes a Big Creek Subwatershed Implementation Plan that recommends projects such as water and sediment control basins (WASCBs) and comprehensive nutrient management plans (CNMPs)[8].

[8] Paulin, E. 2019, November 19. Crawford County Health Department, Director of Environmental Health. Email correspondence

[9] http://www.ccswcd.com/media/files/embarraswmp_final_version110111.pdf

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Section 6

Approach to Developing TMDL and Identification of Data Needs

Illinois EPA is currently developing TMDLs for pollutants that have numeric water quality standards. Of the pollutants listed for causing impairment in the Big Creek watershed, DO and manganese are the parameters for which numeric water quality standards currently exist. In addition, load reductions goals exist for total phosphorus based on the Illinois NLRS. Refer to Table 1-1 for a full list of potential causes of impairment.

6.1 Simple and Detailed Approaches for Developing TMDLs

The range of analyses used for developing TMDLs varies from simple to complex. Examples of a simple approach include mass-balance, load-duration, and simple watershed and receiving water models. Detailed approaches incorporate the use of complex watershed and receiving water models. Simplistic approaches typically require less data than detailed approaches. Establishing a link between pollutant loads and resulting water quality is one of the most important steps in developing a TMDL. As discussed above, this link can be established through a variety of techniques. The objective of the remainder of this section is to recommend approaches for establishing these links for the constituents of concern in the Big Creek watershed.

6.2 Additional Data Needs for TMDL and Load Reduction Development in the Big Creek Watershed

Table 6-1 contains summary information regarding data availability for all impairments to be addressed by TMDLs and water quality goals in the Big Creek watershed. The available datasets for assessing impairments on Dogwood Creek segment BEDB-01 are generally sufficient for basic TMDL and water quality goal calculations and model development. Although the available dissolved manganese data for Dogwood Creek segment BEDB-01 show that this segment may once have been impaired based on a previous standard, it is no longer impaired when compared to the currently applicable water quality standard. It is recommended that this segment be removed from the current 303(d) list for aquatic life use impairment by dissolved manganese. Additional data collection is recommended for the remaining parameters due to limited results showing impairment and data needed to support model development.

There are seven data points for DO in impaired stream segment BEDB-01. A TMDL could potentially be developed with this limited dataset, however, in order to develop a more robust model for this segment, additional data pertaining to the stream segment's impairments may need to be collected. Sample collection at various times of year and over a range of flow conditions would aid in assessing the entire range of DO conditions that may occur within the segment and would provide for a more accurate depiction of potential factors influencing the DO impairments in Dogwood Creek. Additional data collection is also recommended to support model development. Specific data requirements include a synoptic (snapshot in time) water quality survey of the reach with careful attention to the location of the point source discharge. The survey should include measurements of flow, hydraulics, DO, temperature,

nutrients, sediment oxygen demand (SOD), and carbonaceous biochemical oxygen demand (CBOD). The collected data would be used to support the model development and parameterization and would lend significant confidence to the TMDL conclusions.

Table 6-1 Data Availability and Data Needs for TMDL and Water Quality Goal Development in the Big Creek Watershed

Impaired Segment	Impairment	Period of Record	Data Points for Impairment Assessment	Additional Data Needs
Dogwood Creek (BEDB-01)	Dissolved Oxygen	2006-2016	7	Additional DO data for impairment assessment (most recent data did not violate standard); Synoptic data for flow, hydraulics, DO, temperature, nutrients, CBOD, and SOD
	Manganese	2006-2016	7	None – Recommend delisting
	Phosphorus (Total)	2006-2016	12	None

6.3 Approaches for Developing TMDLs and Water Quality Goals for Dogwood Creek

6.3.1 Recommended Approach for Dissolved Oxygen

The recommended approach to TMDL development for the DO impairment in Dogwood Creek is the development and parameterization of a QUAL2K model. QUAL2K is an updated spreadsheet-based version of the well-known and USEPA-supported QUAL2E model[1]. The model simulates DO dynamics as a function of nitrogenous oxygen demand (NOD) and CBOD, atmospheric re-aeration, SOD, and phytoplankton photosynthesis and respiration. The model also simulates the fate and transport of nutrients and BOD and the presence and abundance of phytoplankton (as chlorophyll-a). Stream hydrodynamics and temperature are important controlling parameters in the model. The model is suited to steady-state simulations. It is not anticipated that an additional watershed model will be needed to develop a DO TMDL for this stream. Additional data collection is recommended for Dogwood Creek to confirm current impairment and to build a more robust model.

6.3.2 Recommended Approach for Manganese and Total Phosphorus

The data review performed for Dogwood Creek segment BEDB-01 show that dissolved manganese concentrations in this segment support the general use and it is recommended that it be removed from the current 303(d) list.

The recommended approach for establishing a water quality goal for total phosphorus in Dogwood Creek is a modified load duration curve method. The load duration methodology uses the cumulative frequency distribution of stream flow and pollutant concentration data to estimate the allowable loads for a waterbody. CDM Smith will work closely with Illinois EPA to determine the target load to use based on the Illinois NLRS interim goal of 25% load reduction.

[1] Brown, L.C. and Barnwell, T.O. 1987. The enhanced stream water quality models QUAL2E and QUAL2E-UNCAS: documentation and user manual. EPA-600-3-87-007, US Environmental Protection Agency, Athens, GA

Section 7
References

Brown, L.C. and Barnwell, T.O. 1987. The enhanced stream water quality models QUAL2E and QUAL2E-UNCAS: documentation and user manual. EPA-600-3-87-007, US Environmental Protection Agency, Athens, GA.

IDA (Illinois Department of Agriculture). 2018. Illinois Soil Conservation Transect Survey Reports. Retrieved from https://www2.illinois.gov/sites/agr/Resources/LandWater/Pages/Illinois-Soil-Conservation-Transect-Survey-Reports.aspx.

IDA. 2015. Illinois Soil Conservation Transect Survey Reports. Retrieved from https://www2.illinois.gov/sites/agr/Resources/LandWater/Pages/Illinois-Soil-Conservation-Transect-Survey-Reports.aspx.

IDA.2019. Illinois Nutrient Loss Reduction Strategy. Illinois Nutrient Loss Reduction Strategy - Nutrient Loss Reduction Strategy.

IEPA (Illinois Environmental Protection Agency). 2019. River and Stream. Retrieved from https://www2.illinois.gov/epa/topics/water-quality/monitoring/Pages/river-and-stream.aspx.

IEPA. 2018. Illinois Integrated Water Quality Report and Section 303(d) List, 2018. Retrieved from https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx

IEPA. 2014. Illinois Water Monitoring Strategy 2015 - 2020. Retrieved from https://www2.illinois.gov/epa/Documents/epa.state.il.us/water/water-quality/monitoring-strategy/monitoring-strategy-2015-2020.pdf.

ILGA (Illinois General Assembly). 2015. Title 35: Environmental Protection, Subtitle C: Water Pollution, Chapter I: Pollution Control Board, Part 302: Water Quality Standards. Retrieved from http://www.ilga.gov/commission/jcar/admincode/035/03500302sections.html.

ISWS (Illinois State Water Survey). State Climatologist Office for Illinois: Data Request for Pan Evaporation in Illinois. https://www.isws.illinois.edu/warm/reservoirs/contact.asp

Klingler, L. 2019, November 11. Natural Resource Conservation Service (NRCS) - Crawford County, District Conservationist. Email correspondence.

NOAA (National Oceanic and Atmosphere Administration). 2109. Palestine, IL, Station ID USC00116558. Retrieved from https://www.ncdc.noaa.gov/cdo-web/datatools/findstation.

NRCS (Natural Resources Conservation Service). 2011. Updated T and K Factors – Q&A-Wisconsin. Retrieved from https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_019867.pdf.

NRCS. 2007. Part 630 Hydrology National Engineering Handbook: Hydrologic Soil Groups. United States Department of Agriculture. Retrieved from http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba.

Paulin, E. 2019, November 19. Crawford County Health Department, Director of Environmental Health. Email correspondence.

U.S. Census Bureau (Census). 2015. TIGER 2015 Census Block Groups. Retrieved from https://datagateway.nrcs.usda.gov/GDGOrder.aspx?order=QuickState#.

USDA (U.S. Department of Agriculture). 2018. National Agricultural Statistics Service: CropScape and Copland Data Layer. Last Modified 9/12/2019. https://www.nass.usda.gov/Research_and_Science/Cropland/Release/index.php

USDA. 2017. Census of Agriculture: 2017 Census Volume 1, Chapter 2: County Level Data, Illinois. Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Illinois/.

USDA. 2012. Census of Agriculture: 2012 Census Volume 1, Chapter 2: County Level Data, Illinois. Retrieved from https://www.nass.usda.gov/Publications/AgCensus/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Illinois/.

USDA. 2019. Soil Surveys for Illinois. Retrieved from: Soil Surveys by State | NRCS Soils (usda.gov)

U.S. Environmental Protection Agency (USEPA). 2020. Discharge Monitoring Report Data and Facility Information for Permit ILG582017. Village of Oblong. Retrieved from https://echo.epa.gov/trends/loading-tool/reports/dmr-pollutant-loading?year=2020&permit_id=ILG582017

USGS (U.S. Geological Survey). 2019. Streamflow Measurements for Illinois. Retrieved from https://waterdata.usgs.gov/il/nwis/measurements.

USGS. 2019. National Elevation Dataset. Retrieved from https://catalog.data.gov/dataset/usgs-national-elevation-dataset-ned

V3 Companies, LTD. 2011. Embarras River Watershed Management Plan. http://www.ccswcd.com/media/files/embarraswmp_final_version110111.pdf

Appendix A

Land Use Categories

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Table A-1: Big Creek TMDL Watershed Land Use

Land Cover Category	acres	Percent
Soybeans	27,021	37.5%
Corn	21,562	29.9%
Deciduous Forest	12,419	17.2%
Developed/Open Space	5,141	7.1%
Grass/Pasture	3,574	5.0%
Woody Wetlands	773	1.1%
Developed/Low Intensity	769	1.1%
Double Crop Winter Wheat/Soybeans	326	0.5%
Open Water	183	0.3%
Other Hay/Non Alfalfa	116	0.2%
Developed/Med Intensity	99	0.1%
Herbaceous Wetlands	43	<0.1%
Barren	26	<0.1%
Developed/High Intensity	17	<0.1%
Shrubland	10	<0.1%
Alfalfa	10	<0.1%
Fallow/Idle Cropland	1.8	<0.1%
Grapes	0.7	<0.1%
Sorghum	0.7	<0.1%
Evergreen Forest	0.6	<0.1%
Winter Wheat	0.4	<0.1%
Sod/Grass Seed	0.2	<0.1%
Total	**72,093**	**100%**

Table A-2: BEDB-01 Subbasin Land Use

Land Cover Category	acres	Percentage
Soybeans	5,556	40.7%
Corn	3,946	28.9%
Deciduous Forest	1,625	11.9%
Developed/Open Space	1,222	9.0%
Grass/Pasture	774	5.7%
Developed/Low Intensity	240	1.8%
Woody Wetlands	101	0.7%
Double Crop Winter Wheat/Soybeans	58	0.4%
Developed/Med Intensity	40	0.3%
Other Hay/Non Alfalfa	39	0.3%
Open Water	29	0.2%
Developed/High Intensity	8.9	<0.1%
Barren	6.7	<0.1%
Herbaceous Wetlands	3.8	<0.1%
Alfalfa	1.5	<0.1%
Shrubland	0.9	<0.1%
Fallow/Idle Cropland	0.6	<0.1%
Sod/Grass Seed	0.2	<0.1%
Total	**13,651**	**100%**

Appendix B

Soil Series Data

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Table B-1: Big Creek Soil Series Data 1

Hydrologic Group - Dominant Condition	Acres	Percent
C/D	58,518.6	81.1%
C	3,964.0	5.5%
D	3,818.7	5.3%
B/D	2,870.0	4.0%
B	2,667.3	3.7%
A	50.1	0.1%
A/D	6.4	0.0%
<Null>	280.0	0.4%
Total	72,175.1	

Table B-2: Big Creek Soil Series Data 2

MUKEY	Mapunit Symbol	Mapunit Name	Hydrologic Group - Dominant Condition	K-Factor Rock Free	Acres	Percent
166420	2A	Cisne silt loam, 0 to 2 percent slopes	C/D	0.46	16,367.7	22.7%
166430	13A	Bluford silt loam, 0 to 2 percent slopes	C/D	0.45	14,216.1	19.7%
166429	12A	Wynoose silt loam, 0 to 2 percent slopes	C/D	0.44	10,340.1	14.3%
166421	3A	Hoyleton silt loam, 0 to 2 percent slopes	C/D	0.41	4,219.3	5.8%
1151362	13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	C/D	0.42	3,514.3	4.9%
166432	14B	Ava silt loam, 2 to 5 percent slopes	C	0.48	2,642.5	3.7%
200160	3333A	Wakeland silt loam, 0 to 2 percent slopes, frequently flooded	B/D	0.54	2,591.0	3.6%
200161	3334A	Birds silt loam, 0 to 2 percent slopes, frequently flooded	C/D	0.49	2,407.5	3.3%
166424	7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	D	0.41	2,094.1	2.9%
166427	946D2	Hickory-Atlas complex, 10 to 18 percent slopes, eroded	B	0.3	1,372.8	1.9%
1444931	12A	Wynoose silt loam, 0 to 2 percent slopes	C/D	0.44	1,258.7	1.7%
200158	3288A	Petrolia silty clay loam, 0 to 2 percent slopes, frequently flooded	C/D	0.4	1,187.2	1.6%
166426	7D2	Atlas silt loam, 10 to 18 percent slopes, eroded	D	0.41	1,133.5	1.6%
200167	8F	Hickory silt loam, 18 to 35 percent slopes	B	0.33	1,043.2	1.4%
166423	6B2	Fishhook silt loam, 2 to 5 percent slopes, eroded	C/D	0.39	985.6	1.4%
166433	14C2	Ava silt loam, 5 to 10 percent slopes, eroded	C	0.55	828.3	1.1%
1444934	109A	Racoon silt loam, 0 to 2 percent slopes	C/D	0.49	735.1	1.0%
869353	13A	Bluford silt loam, 0 to 2 percent slopes	C/D	0.45	726.0	1.0%

195699	119C2	Elco silt loam, 5 to 10 percent slopes, eroded	C/D	0.4	651.9	0.9%
166425	7C3	Atlas silty clay loam, 5 to 10 percent slopes, severely eroded	D	0.4	510.4	0.7%
849135	912A	Hoyleton-Darmstadt silt loams, 0 to 2 percent slopes	C/D	0.45	468.6	0.6%
166422	3B	Hoyleton silt loam, 2 to 5 percent slopes	C/D	0.41	392.0	0.5%
1444932	14B	Ava silt loam, 2 to 5 percent slopes	C	0.48	335.4	0.5%
200142	218A	Newberry silt loam, 0 to 2 percent slopes	C/D	0.4	264.2	0.4%
200166	W	Water	<Null>	<Null>	260.4	0.4%
200163	3424A	Shoals silt loam, 0 to 2 percent slopes, frequently flooded	B/D	0.43	258.5	0.4%
200159	3331A	Haymond silt loam, 0 to 2 percent slopes, frequently flooded	B	0.51	247.1	0.3%
195710	138A	Shiloh silty clay loam, 0 to 2 percent slopes	C/D	0.31	216.2	0.3%
1585899	138A	Shiloh silty clay loam, 0 to 2 percent slopes	C/D	0.31	153.7	0.2%
200156	3070A	Beaucoup silty clay loam, 0 to 2 percent slopes, frequently flooded	C/D	0.4	133.1	0.2%
849141	3071A	Darwin silty clay, 0 to 2 percent slopes, frequently flooded	C/D	0.33	122.8	0.2%
195691	50A	Virden silty clay loam, 0 to 2 percent slopes	C/D	0.36	109.9	0.2%
195700	119D	Elco silt loam, 10 to 18 percent slopes	C	0.4	103.5	0.1%
869354	13B2	Bluford silt loam, 2 to 5 percent slopes, eroded	C/D	0.42	48.3	0.1%
195716	164A	Stoy silt loam, 0 to 2 percent slopes	D	0.52	46.4	0.1%
1585896	131B	Alvin fine sandy loam, 2 to 5 percent slopes	A	0.28	33.1	0.0%
869356	14C2	Ava silt loam, 5 to 10 percent slopes, eroded	C	0.55	29.5	0.0%
1444944	212B	Thebes loam, 2 to 5 percent slopes	C	0.2	24.7	0.0%
869384	7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	D	0.41	22.7	0.0%
848318	M-W	Miscellaneous water	<Null>	<Null>	19.6	0.0%

200038	178A	Ruark fine sandy loam, 0 to 2 percent slopes	B/D	0.26	19.2	0.0%
195702	131B	Alvin fine sandy loam, 2 to 5 percent slopes	A	0.28	10.8	0.0%
200036	31A	Pierron silt loam, 0 to 2 percent slopes	D	0.49	7.6	0.0%
1444943	184A	Roby fine sandy loam, 0 to 2 percent slopes	A/D	0.19	6.4	0.0%
195701	131A	Alvin fine sandy loam, 0 to 2 percent slopes	A	0.28	4.3	0.0%
869386	7D2	Atlas silt loam, 10 to 18 percent slopes, eroded	D	0.41	4.0	0.0%
849123	434B	Ridgway silt loam, 2 to 5 percent slopes	B	0.25	3.3	0.0%
1585897	131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded	A	0.28	2.0	0.0%
1444942	178A	Ruark fine sandy loam, 0 to 2 percent slopes	B/D	0.26	1.3	0.0%
849122	434A	Ridgway silt loam, 0 to 2 percent slopes	B	0.25	0.9	0.0%
195695	112A	Cowden silt loam, 0 to 2 percent slopes	C/D	0.47	0.1	0.0%
					72,175.1	

Appendix C

Water Quality Data

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StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Zinc	Total	5.24	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Cobalt	Dissolved	1.17	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Cadmium	Total	0.74	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Boron	Total	36.5	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Beryllium	Total	0.69	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Barium	Total	80.1	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Aluminum	Total	261	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Chromium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	2340B	Hardness, Ca, Mg		111000	ug/l	C
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	420.4	Phenols	Total	1.62	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Strontium	Total	100	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Beryllium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Nickel	Dissolved	1.2	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Manganese	Dissolved	395	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Magnesium	Dissolved	8550	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Iron	Dissolved	476	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	5310-C	Organic carbon	Total	12.6	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Potassium	Total	14700	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	LAB	Temperature, sample		2	deg C	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	160.4	Volatile suspended solids			mg/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	310.2	Alkalinity, total		107	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	365.1	Phosphorus	Total	0.677	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	351.2	Kjeldahl nitrogen	Total	2.16	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.271	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Calcium	Total	30200	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Sodium	Total	18300	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Silver	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Nickel	Total	1.6	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Manganese	Total	407	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Magnesium	Total	8530	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Lead	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Iron	Total	1300	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	2540-D	Total suspended solids		9	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Copper	Total	1.85	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	350.1	Ammonia-nitrogen	Total	0.87	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	2130-B	Turbidity		30.6	NTU	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Vanadium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Strontium	Dissolved	95.3	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	7.12	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Calcium	Dissolved	29300	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	10200H(2)	Pheophytin a	Total	4.39	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Zinc	Dissolved	2.39	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	4500-O-G	Dissolved oxygen (DO)		4	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	4.29	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	FIELD	Dissolved oxygen saturation		41	%	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	150.1	pH		8.2	None	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	I1780	Specific conductance		348	umho/cm	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	FIELD	Temperature, air		23	deg C	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	170.1	Temperature, water		18.2	deg C	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Cobalt	Total	0.94	ug/l	J
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	10200H(2)	Chlorophyll c	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.8	Selenium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Boron	Dissolved	39.3	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Sodium	Dissolved	16900	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Barium	Dissolved	64.5	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	10200H(2)	Chlorophyll b	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	365.1	Phosphorus	Dissolved	0.46	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.8	Arsenic	Dissolved	4.23	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.8	Arsenic	Total	5.13	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Potassium	Dissolved	14200	ug/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.8	Selenium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	300	Fluoride	Total	0.19	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	300	Chloride	Total	36	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Vanadium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	300	Sulfate	Total	11.7	mg/l	
BEDB-02	DOGWOOD CREEK	10/5/2016	Water	200.7	Aluminum	Dissolved	90.4	ug/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.505	mg/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	350.1	Ammonia-nitrogen	Total	3.12	mg/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	2540-D	Total suspended solids		24	mg/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	160.4	Volatile suspended solids		6	mg/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	365.1	Phosphorus	Total	0.887	mg/l	

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	351.2	Kjeldahl nitrogen	Total	4.42	mg/l	
BEDB-02	DOGWOOD CREEK	8/2/2016	Water	LAB	Temperature, sample		3	deg C	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	365.1	Phosphorus	Total	0.4	mg/l	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	LAB	Temperature, sample		3	deg C	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	350.1	Ammonia-nitrogen	Total	0.57	mg/l	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	160.4	Volatile suspended solids		4	mg/l	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	351.2	Kjeldahl nitrogen	Total	1.87	mg/l	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	1.33	mg/l	
BEDB-02	DOGWOOD CREEK	6/20/2016	Water	2540-D	Total suspended solids		21	mg/l	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	365.1	Phosphorus	Total	0.423	mg/l	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	350.1	Ammonia-nitrogen	Total	0.16	mg/l	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	160.4	Volatile suspended solids		16	mg/l	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	351.2	Kjeldahl nitrogen	Total	1.92	mg/l	J3
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.833	mg/l	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	LAB	Temperature, sample		1	deg C	
BEDB-02	DOGWOOD CREEK	6/13/2016	Water	2540-D	Total suspended solids		73	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	160.4	Volatile suspended solids		12	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Beryllium	Total	0.54	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	300	Sulfate	Total	28.8	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	2540-D	Total suspended solids		23	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Calcium	Total	44200	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	5310-C	Organic carbon	Total	9.69	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Aluminum	Total	171	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Barium	Total	92	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Boron	Total	46.5	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Cadmium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	300	Chloride	Total	57.7	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Nickel	Dissolved	1.2	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	1.93	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Chromium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Aluminum	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Barium	Dissolved	86.3	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Boron	Dissolved	41.3	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	300	Fluoride	Total	0.29	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Zinc	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	10200H(2)	Pheophytin a	Total	2.67	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Manganese	Total	403	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	10200H(2)	Chlorophyll c	Total	2.81	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	10200H(2)	Chlorophyll b	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	77.6	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	351.2	Kjeldahl nitrogen	Total	2.2	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	LAB	Temperature, sample		3	deg C	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	310.2	Alkalinity, total		130	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Sodium	Dissolved	31900	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Strontium	Dissolved	151	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Potassium	Dissolved	9340	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	365.1	Phosphorus	Total	0.357	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	350.1	Ammonia-nitrogen	Total	0.29	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	420.4	Phenols	Total	1.48	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	73.1	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	FIELD	Dissolved oxygen saturation		67	%	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Strontium	Total	156	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	2340B	Hardness, Ca, Mg		162000	ug/l	C
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Zinc	Total	30.6	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Copper	Total	1.28	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.8	Arsenic	Total	2.46	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Vanadium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Nickel	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	4500-O-G	Dissolved oxygen (DO)		6.4	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Cobalt	Total	0.72	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	150.1	pH		7.9	None	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	I1780	Specific conductance		494	umho/cm	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	FIELD	Temperature, air		26	deg C	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	170.1	Temperature, water		18.8	deg C	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	2130-B	Turbidity		30.6	NTU	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Calcium	Dissolved	43300	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.8	Selenium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	365.1	Phosphorus	Dissolved	0.141	mg/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Cobalt	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Sodium	Total	31600	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Iron	Dissolved	58.5	ug/l	

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Magnesium	Dissolved	12800	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Beryllium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.8	Selenium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Iron	Total	755	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Vanadium	Dissolved	7.73	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.8	Arsenic	Dissolved	1.89	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Lead	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Potassium	Total	9670	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Silver	Total	0.82	ug/l	J
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Magnesium	Total	12600	ug/l	
BEDB-02	DOGWOOD CREEK	6/9/2016	Water	200.7	Manganese	Dissolved	396	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.8	Selenium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.671	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Manganese	Total	509	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Potassium	Total	6100	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	5310-C	Organic carbon	Total	9.99	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	420.4	Phenols	Total	4.17	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	350.1	Ammonia-nitrogen	Total	0.1	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	300	Chloride	Total	71.1	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	300	Fluoride	Total	0.31	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Cobalt	Total	0.98	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	365.1	Phosphorus	Total	0.333	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Chromium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Barium	Total	99.8	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Beryllium	Total	0.35	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.8	Arsenic	Total	2.85	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Aluminum	Total	224	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Iron	Total	899	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	10200H(2)	Pheophytin a	Total	11.7	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Iron	Dissolved	67.5	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	71.9	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Boron	Total	51.3	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	10200H(2)	Chlorophyll c	Total	1.39	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Lead	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Sodium	Total	50900	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	62.1	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	2340B	Hardness, Ca, Mg		212000	ug/l	C
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Zinc	Total	15.4	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Magnesium	Total	18200	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Nickel	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.8	Arsenic	Dissolved	2	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Silver	Total	1.03	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Calcium	Total	54800	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Strontium	Total	201	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Vanadium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Copper	Total	1.33	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	150.1	pH		7	None	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Cobalt	Dissolved	1.28	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Nickel	Dissolved	0.71	ug/l	J
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	LAB	Temperature, sample		1	deg C	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	160.4	Volatile suspended solids		10	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	351.2	Kjeldahl nitrogen	Total	1.57	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Magnesium	Dissolved	17200	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	2540-D	Total suspended solids		24	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	FIELD	Dissolved oxygen saturation		56	%	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	I1780	Specific conductance		623	umho/cm	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	FIELD	Temperature, air		26	deg C	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	170.1	Temperature, water		19.1	deg C	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	4500-O-G	Dissolved oxygen (DO)		5	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	2130-B	Turbidity		26	NTU	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	10200H(2)	Chlorophyll b	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	310.2	Alkalinity, total		189	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Aluminum	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.8	Selenium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	300	Sulfate	Total	30.1	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Strontium	Dissolved	183	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Vanadium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Zinc	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	365.1	Phosphorus	Dissolved	0.116	mg/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Manganese	Dissolved	465	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Cadmium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Barium	Dissolved	87.2	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Beryllium	Dissolved		ug/l	ND

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Boron	Dissolved	50.4	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Calcium	Dissolved	53800	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Sodium	Dissolved	46900	ug/l	
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	5/25/2016	Water	200.7	Potassium	Dissolved	5810	ug/l	
BEDB-01		6/8/2011	Water	4500-O-G	Dissolved oxygen (DO)		0.3	mg/l	
BEDB-01		6/8/2011	Water	FIELD	Dissolved oxygen saturation		3	%	
BEDB-01		6/8/2011	Water	150.1	pH		7.2	none	
BEDB-01		6/8/2011	Water	I1780	Specific conductance		1456	umho/cm	
BEDB-01		6/8/2011	Water	FIELD	Temperature, air		34	deg C	
BEDB-01		6/8/2011	Water	170.1	Temperature, water		14.8	deg C	
BEDB-01		6/8/2011	Water	2130-B	Turbidity		44	NTU	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	2320-B	Alkalinity, total		165	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Aluminum	Dissolved	165	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Aluminum	Total	1300	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	350.3	Ammonia-nitrogen	Total	0.33	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6020	Arsenic	Dissolved	5.94	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6020	Arsenic	Total	6.94	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Barium	Dissolved	1280	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Barium	Total	900	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Beryllium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Beryllium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Boron	Dissolved	75.8	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Boron	Total	101	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Cadmium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Cadmium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Calcium	Dissolved	46400	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Calcium	Total	45900	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	4500-CL-(E)	Chloride	Total	122	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Chromium	Dissolved	1.7	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Chromium	Total	2.54	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Cobalt	Dissolved	0.49	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Cobalt	Total	0.35	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Copper	Dissolved	5.96	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Copper	Total	6.25	ug/l	V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	335.4	Cyanide	Total		mg/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	4500-F-C	Fluoride	Total	0.32	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Hardness, Ca, Mg		172000	ug/l	C
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.553	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Iron	Dissolved	242	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Iron	Total	1880	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	351.2	Kjeldahl nitrogen	Total	1.26	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Lead	Dissolved	2.52	ug/l	J,V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Lead	Total		ug/l	ND,V
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Magnesium	Dissolved	14300	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Magnesium	Total	13900	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Manganese	Dissolved	1600	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Manganese	Total	1570	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Nickel	Dissolved	1.63	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Nickel	Total	2.24	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	5310-C	Organic carbon	Total	10.8	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	420.4	Phenols	Total	1.91	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	365.3	Phosphorus	Dissolved	0.145	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	365.3	Phosphorus	Total	0.332	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Potassium	Dissolved	7720	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Potassium	Total	7830	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Silver	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Silver	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Sodium	Dissolved	126000	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Sodium	Total	94300	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Strontium	Dissolved	407	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Strontium	Total	328	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	375.2	Sulfate	Total	13.4	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	LAB	Temperature, sample		6	deg C	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	2540-D	Total suspended solids		39	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Vanadium	Dissolved	0.67	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Vanadium	Total	2.56	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	160.4	Volatile suspended solids		9	mg/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Zinc	Dissolved	1.44	ug/l	J
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	6010B	Zinc	Total	6.32	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	14.9	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	19.4	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	10200H(2)	Chlorophyll b	Total	2.93	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	10200H(2)	Chlorophyll c	Total	0.91	ug/l	
BEDB-01	DOGWOOD CREEK	6/8/2011	Water	10200H(2)	Pheophytin a	Total	6.83	ug/l	

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	350.3	Ammonia-nitrogen	Total	0.38	mg/l	
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.467	mg/l	Q
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	351.2	Kjeldahl nitrogen	Total	3.18	mg/l	J6
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	365.3	Phosphorus	Total	0.56	mg/l	
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	LAB	Temperature, sample		2	deg C	
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	2540-D	Total suspended solids		15	mg/l	
BEDB-01	DOGWOOD CREEK	6/15/2011	Water	160.4	Volatile suspended solids		9	mg/l	
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	350.3	Ammonia-nitrogen	Total	0.13	mg/l	
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	353.2	Inorganic nitrogen (nitrate and nitrite)	Total	0.034	mg/l	J
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	351.2	Kjeldahl nitrogen	Total	5.5	mg/l	J3,J7
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	365.3	Phosphorus	Total	1.44	mg/l	
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	LAB	Temperature, sample		2	deg C	
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	2540-D	Total suspended solids		25	mg/l	
BEDB-01	DOGWOOD CREEK	8/17/2011	Water	160.4	Volatile suspended solids		26	mg/l	
BEDB-02		5/31/2006	Water	FIELD	Dissolved oxygen (DO)		3.4	mg/l	
BEDB-02		5/31/2006	Water	FIELD	pH		7.3		
BEDB-02		5/31/2006	Water	FIELD	Specific conductance		1180	umho/cm	
BEDB-02		5/31/2006	Water	FIELD	Temperature, air		25	deg C	
BEDB-02		5/31/2006	Water	FIELD	Temperature, water		21.9	deg C	
BEDB-02		5/31/2006	Water	FIELD	Turbidity		19	NTU	
BEDB-02		8/7/2006	Water	FIELD	Dissolved oxygen (DO)		3.6	mg/l	
BEDB-02		8/7/2006	Water	FIELD	pH		7.3		
BEDB-02		8/7/2006	Water	FIELD	Specific conductance		400	umho/cm	
BEDB-02		8/7/2006	Water	FIELD	Temperature, air		29	deg C	
BEDB-02		8/7/2006	Water	FIELD	Temperature, water		27.4	deg C	
BEDB-02		8/7/2006	Water	FIELD	Turbidity		27	NTU	
BEDB-02		9/7/2006	Water	FIELD	Dissolved oxygen (DO)		3.3	mg/l	
BEDB-02		9/7/2006	Water	FIELD	pH		7.5		
BEDB-02		9/7/2006	Water	FIELD	Specific conductance		575	umho/cm	
BEDB-02		9/7/2006	Water	FIELD	Temperature, air		20	deg C	
BEDB-02		9/7/2006	Water	FIELD	Temperature, water		18	deg C	
BEDB-02		9/7/2006	Water	FIELD	Turbidity		38	NTU	
BEDB-02	Dogwood Creek	5/31/2006	Water	310.1	Alkalinity, total		168	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	5310-C	Carbon, organic	Total	8.6	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	325.2	Chloride	Total	255	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	335.3	Cyanide	Total		mg/l	ND
BEDB-02	Dogwood Creek	5/31/2006	Water	340.2	Fluorides	Total	0.35	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	350.3	Nitrogen, ammonia as N	Total	1.56	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	351.2	Nitrogen, Kjeldahl	Total	2.8	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	353.2	Nitrogen, Nitrite (NO2) + Nitrate (NO3) as N	Total	0.497	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	420.2	Phenols	Total	4	ug/l	J
BEDB-02	Dogwood Creek	5/31/2006	Water	365.2	Phosphorus as P	Dissolved	0.442	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	365.2	Phosphorus as P	Total	0.763	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	160.4	Solids, suspended, volatile			mg/l	ND
BEDB-02	Dogwood Creek	5/31/2006	Water	160.2	Solids, Total Suspended (TSS)		14	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	375.4	Sulfate	Total	28	mg/l	
BEDB-02	Dogwood Creek	5/31/2006	Water	LAB	Temperature, sample		1.4	deg C	
BEDB-02	Dogwood Creek	8/7/2006	Water	5310-C	Carbon, organic	Total	10	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	335.3	Cyanide	Total	0.004	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	350.3	Nitrogen, ammonia as N	Total	0.59	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	351.2	Nitrogen, Kjeldahl	Total	2.2	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	353.2	Nitrogen, Nitrite (NO2) + Nitrate (NO3) as N	Total	0.043	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	420.2	Phenols	Total		ug/l	ND
BEDB-02	Dogwood Creek	8/7/2006	Water	365.2	Phosphorus as P	Dissolved	0.18	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	365.2	Phosphorus as P	Total	0.53	mg/l	
BEDB-02	Dogwood Creek	8/7/2006	Water	LAB	Temperature, sample		1.2	deg C	
BEDB-02	Dogwood Creek	9/7/2006	Water	310.1	Alkalinity, total		199	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	5310-C	Carbon, organic	Total	12.4	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	325.2	Chloride	Total	57	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	335.2	Cyanide	Total		mg/l	ND
BEDB-02	Dogwood Creek	9/7/2006	Water	340.2	Fluorides	Total	0.41	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	350.3	Nitrogen, ammonia as N	Total	1.22	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	351.2	Nitrogen, Kjeldahl	Total	3.8	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	353.2	Nitrogen, Nitrite (NO2) + Nitrate (NO3) as N	Total	0.7	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	420.2	Phenols	Total	9	ug/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	365.2	Phosphorus as P	Dissolved	0.725	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	365.2	Phosphorus as P	Total	1.26	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	160.4	Solids, suspended, volatile		14	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	160.2	Solids, Total Suspended (TSS)		28	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	375.4	Sulfate	Total	16	mg/l	
BEDB-02	Dogwood Creek	9/7/2006	Water	LAB	Temperature, sample		1.6	deg C	
BEDB-02	Dogwood Creek	9/7/2006	Water	LAB	Temperature, sample		1.6	deg C	
BEDB-02	Dogwood Creek	9/7/2006	Water	LAB	Temperature, sample		1.6	deg C	
BEDB-02	Dogwood Creek	9/7/2006	Water	LAB	Temperature, sample		1.6	deg C	
BEDB-02	Dogwood Creek	9/7/2006	Water	LAB	Temperature, sample		1.6	deg C	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Aluminum	Dissolved	49	ug/l	J

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Aluminum	Total	420	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.8	Arsenic	Total	9.4	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Barium	Dissolved	230	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Barium	Total	280	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Beryllium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Beryllium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Boron	Dissolved	89	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Boron	Total	85	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Cadmium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Calcium	Dissolved	57000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Calcium	Total	57000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Chromium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Cobalt	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Cobalt	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Copper	Total	3.2	ug/l	J
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Hardness, Ca + Mg	Total	220000	ug/l	C
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Iron	Dissolved	49	ug/l	J
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Iron	Total	1500	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Lead	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Magnesium	Dissolved	18000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Magnesium	Total	18000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Manganese	Dissolved	2000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Manganese	Total	2000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Nickel	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Nickel	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Potassium	Dissolved	8500	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Potassium	Total	7800	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Silver	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Sodium	Dissolved	170000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Sodium	Total	160000	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Strontium	Dissolved	430	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Strontium	Total	420	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	LAB	Temperature, sample		3	deg C	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	LAB	Temperature, sample		3	deg C	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Vanadium	Dissolved		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Vanadium	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Zinc	Dissolved	5.3	ug/l	J
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	200.7	Zinc	Total	10	ug/l	V
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	3.4	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	5.84	ug/l	
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	10200H(2)	Chlorophyll-b	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	10200H(2)	Chlorophyll-c	Total		ug/l	ND
BEDB-01	DOGWOOD CREEK	5/31/2006	Water	10200H(2)	Pheophytin-a	Total	3.86	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Aluminum	Dissolved	30	ug/l	J
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Aluminum	Total	600	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.8	Arsenic	Total	11	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Barium	Dissolved	110	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Barium	Total	140	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Beryllium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Beryllium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Boron	Dissolved	62	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Boron	Total	67	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Cadmium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Calcium	Dissolved	31000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Calcium	Total	33000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Chromium	Total	2.9	ug/l	J
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Cobalt	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Cobalt	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Copper	Total	3.8	ug/l	J
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Hardness, Ca + Mg	Total	120000	ug/l	C
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Iron	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Iron	Total	1300	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Lead	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Magnesium	Dissolved	9200	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Magnesium	Total	10000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Manganese	Dissolved	860	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Manganese	Total	1000	ug/l	

StationCode	WaterbodyName	CollectionDate	SampleMedium	MethodCode	Analyte	SampleFraction	Result	ResultUnits	Qualifier
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Nickel	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Nickel	Total		ug/l	ND,z
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Potassium	Dissolved	8000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Potassium	Total	8600	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.8	Selenium	Total	0.84	ug/l	J
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Silver	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Sodium	Dissolved	28000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Sodium	Total	31000	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Strontium	Dissolved	160	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Strontium	Total	170	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	LAB	Temperature, sample		6	deg C	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	LAB	Temperature, sample		6	deg C	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Vanadium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Vanadium	Total	4.5	ug/l	J
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Zinc	Dissolved	12	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	200.7	Zinc	Total	13	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	58.6	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	65	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	10200H(2)	Chlorophyll-b	Total	9.82	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	10200H(2)	Chlorophyll-c	Total	2.69	ug/l	
BEDB-02	DOGWOOD CREEK	8/7/2006	Water	10200H(2)	Pheophytin-a	Total	8.27	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Aluminum	Dissolved	42	ug/l	J
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Aluminum	Total	400	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.8	Arsenic	Total	8.9	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Barium	Dissolved	74	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Barium	Total	98	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Beryllium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Beryllium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Boron	Dissolved	150	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Boron	Total	160	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Cadmium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Cadmium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Calcium	Dissolved	49000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Calcium	Total	48000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Chromium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Chromium	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Cobalt	Dissolved	3.3	ug/l	J
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Cobalt	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Copper	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Copper	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Hardness, Ca + Mg	Total	190000	ug/l	C
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Iron	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Iron	Total	1200	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Lead	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Lead	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Magnesium	Dissolved	18000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Magnesium	Total	18000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Manganese	Dissolved	710	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Manganese	Total	760	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Nickel	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Nickel	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Potassium	Dissolved	7400	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Potassium	Total	7500	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Silver	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Silver	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Sodium	Dissolved	49000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Sodium	Total	48000	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Strontium	Dissolved	170	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Strontium	Total	170	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	LAB	Temperature, sample		3	deg C	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	LAB	Temperature, sample		3	deg C	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Vanadium	Dissolved		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Vanadium	Total	3.6	ug/l	J
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Zinc	Dissolved	5.6	ug/l	J
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	200.7	Zinc	Total	4.3	ug/l	J
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	10200H(2)	Chlorophyll a, corrected for pheophytin	Total	55.1	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	10200H(2)	Chlorophyll a, uncorrected for pheophytin	Total	60.2	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	10200H(2)	Chlorophyll-b	Total		ug/l	ND
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	10200H(2)	Chlorophyll-c	Total	1.37	ug/l	
BEDB-02	DOGWOOD CREEK	9/7/2006	Water	10200H(2)	Pheophytin-a	Total	4.65	ug/l	

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