BIG CREEK (LDEQ SUBSEGMENT 080903)

DRAFT WATERSHED IMPLEMENTATION PLAN

For Turbidity

Louisiana Department of Environmental Quality

DEQ
LOUISIANA

Contents

Figures and Tables

1. INTRODUCTION

According to the state's 2016 Integrated Report (IR), Big Creek (Figure 1) is not fully supporting its designated use of fish and wildlife propagation (FWP). The suspected cause of the FWP impairment is high levels of turbidity. The suspected source of the FWP impairment is agriculture (Table 1). The goal of this watershed implementation plan (WIP) is to restore this designated use.

Big Creek (080903) watershed is located in the Ouachita Basin in northern Louisiana. Most of the Ouachita Basin is rich, alluvial plains cultivated in cotton, corn and soybeans. The western portion of the basin is forested with pine trees, which are commercially harvested. Big Creek is approximately 43 miles long, and flows in a general north to south direction from its headwaters to its confluence with the Boeuf River. The drainage area for the watershed is approximately 50 square miles. The watershed has a significant amount of agriculture; main crops are soybeans and corn.

The United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) has implemented agricultural BMPs in Big Creek (Appendix A), and LDEQ has monitored water quality at an ambient water quality network (AWQN) site at the base of the subsegment to determine if water quality has improved due to BMP implementation. Recent LDEQ ambient water quality data for Big Creek show fluctuation with respect to turbidity.

The United States Environmental Protection Agency (USEPA) approved FFY 2017 Section 319 incremental funds for the Louisiana Department of Agriculture and Forestry (LDAF) to implement agricultural BMPs in two 12-digit HUCs in Big Creek – Cane Bayou-Little Creek (080500011010) and Dry Fork Creek - Bee Bayou (080500011005). These two HUC-12 units were selected based on their proximity to the active ambient station. The strategy was to focus on the agricultural areas closest to the active ambient monitoring station in order to maximize the potential for restoration. This strategy is adaptive, and implementation and monitoring could expand into other areas if necessary. LDEQ applied for federal fiscal year (FFY) 2014, 2015, and 2016 Section 319 funds to monitor water quality in these 12-digit HUCs for the duration of the project to determine if the BMPs result in water quality improvements in Big Creek. The results of the project are in the WIP, and are shared with the producers and other watershed stakeholders involved in watershed restoration.

A watershed implementation plan (WIP) provides additional data and information to assist watershed stakeholders with reducing NPS pollution and improving water quality. WIPs form the basis for implementing Louisiana's NPS Management Plan at the watershed scale. In agricultural watersheds, such as Big Creek, implementation of irrigation land leveling, grade stabilization structures, cover crop, precision land forming, and irrigation pipeline are recommended best management practices (BMPs) for reducing NPS pollutants in corn and soybean operations.

The focus of this WIP is implementation of BMPs that will reduce sediment delivered to Big Creek in order to restore the designated use of FWP in the subsegment.

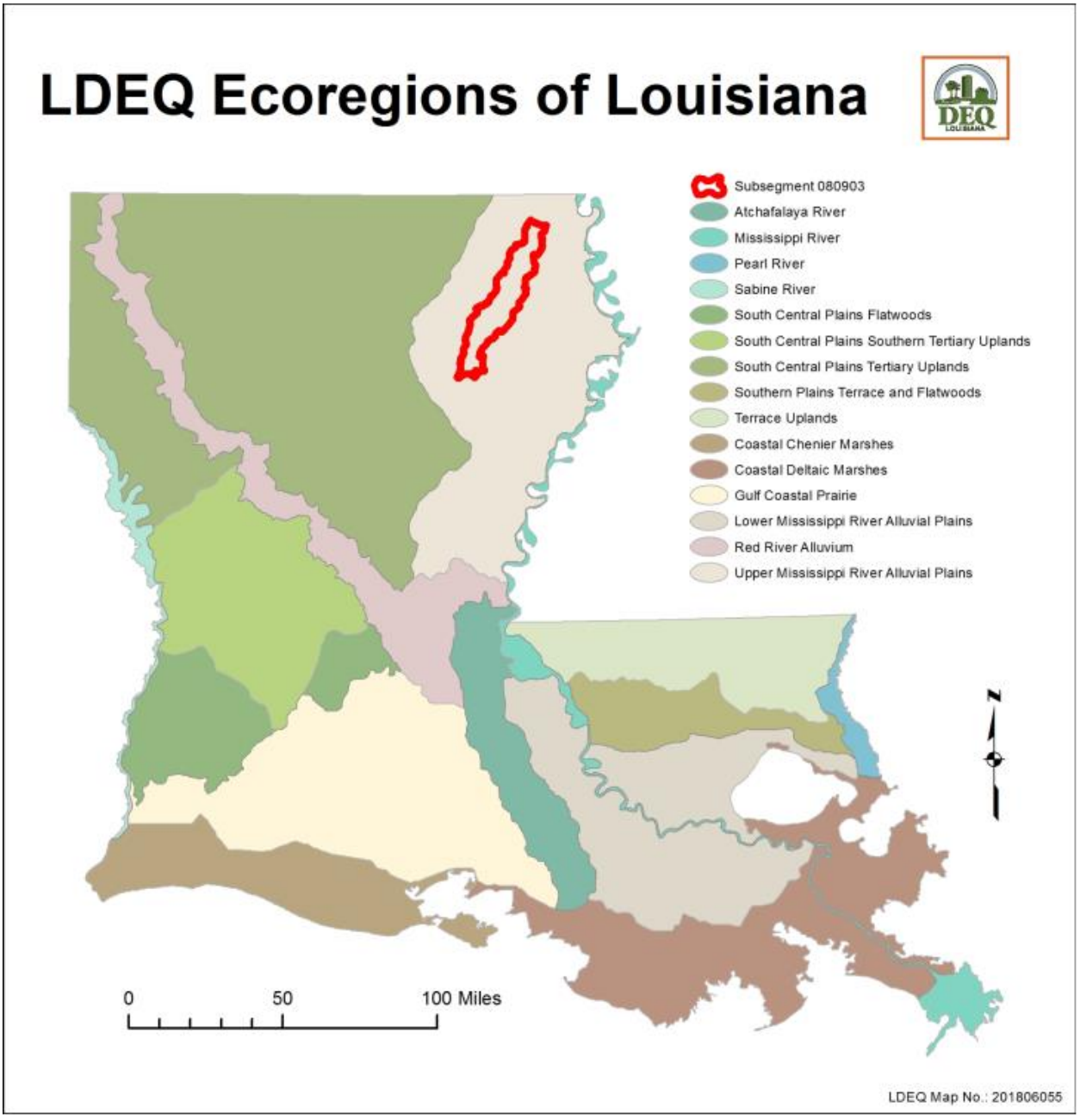


Figure 1 – Map of Big Creek, Subsegment 080903

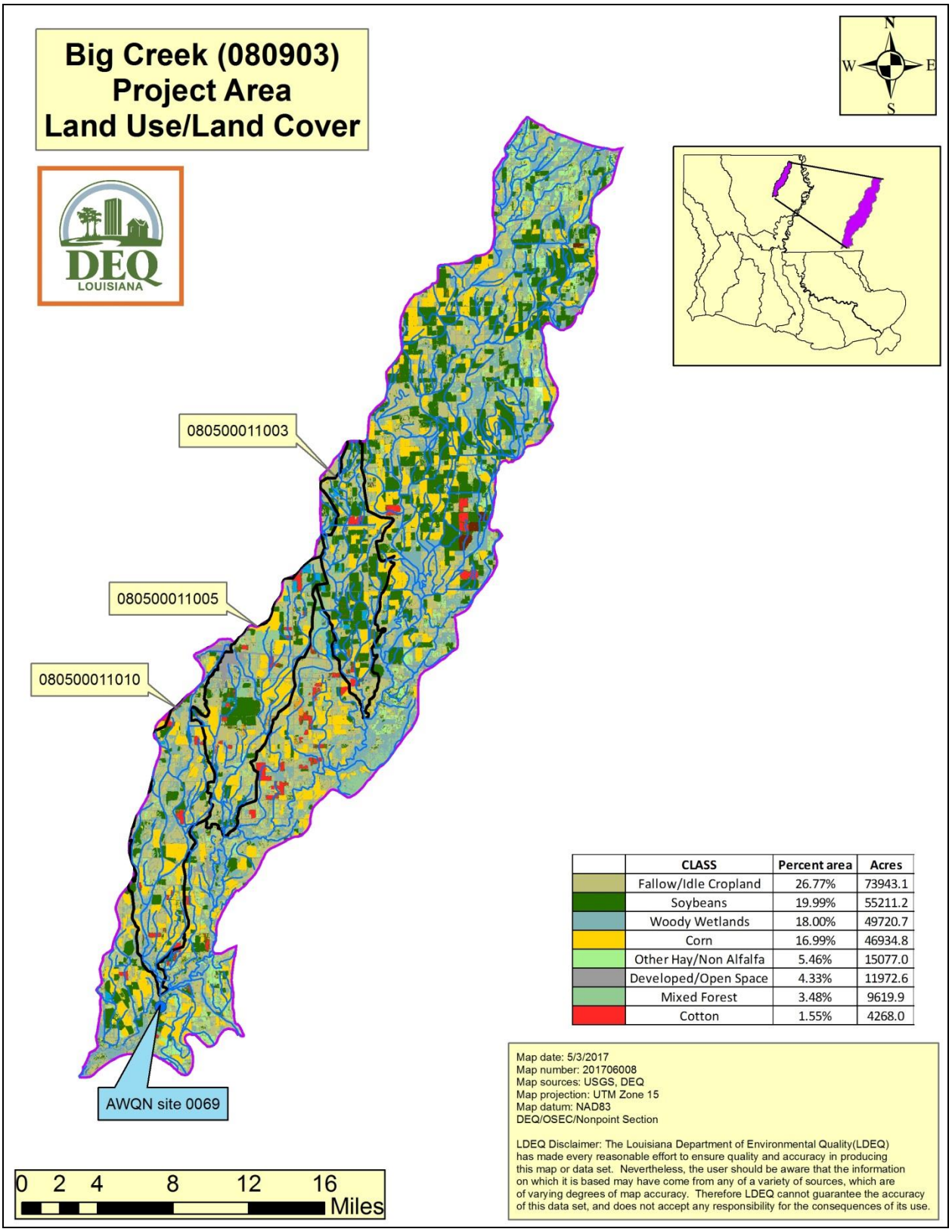


Figure 2 – Big Creek Land Use/Land Cover Map

2. USEPA'S NINE KEY ELEMENTS

In October 2003, USEPA published NPS Program and Grants Guidelines for States and Territories, which included nine key elements of acceptable WIPs. USEPA requires states to develop TMDLs and WIPs in watersheds in order to implement incremental funds.

USEPA'S NINE KEY ELEMENTS

a. Identification of sources and causes or groups of similar sources that will need to be controlled to achieve load reductions estimated in the WIP;
b. An estimate of load reductions expected for management measures described in paragraph (c);
c. A description of NPS management measures that will need to be implemented to achieve estimated load reductions in paragraph (b); and an identification of critical areas where those measures need to be implemented;
d. An estimate of technical and financial assistance, and/or associated costs and authorities necessary to implement the WIP;
e. An information/education component used to enhance public understanding of the project and encourage early and continued participation in selecting, designing and implementing NPS management measures;
f. A schedule for implementing management measures identified in the WIP that is reasonably expeditious;
g. A description of interim, measurable milestones or other control actions being implemented;
h. A set of criteria to determine whether load reductions are being achieved over time and whether substantial progress is being made toward meeting water quality standards;
i. A monitoring component to evaluate effectiveness of implementation efforts over time, measured against criteria established in paragraph (h).

A. CAUSES AND SOURCES TO BE CONTROLLED TO ACHIEVE NPS LOAD REDUCTION

Big Creek does not meet the standard for FWP because of high concentrations of turbidity. Appendix A of the state's 2016 IR listed agriculture as the suspected cause of impairment. A detailed analysis of land use and land cover in Big Creek watershed shows that soybeans and corn are primary crops (Figure 2). The Soil and Water Assessment Tool (SWAT) watershed model was applied to the Big Creek watershed to identify critical areas for NPS loading. Results of this model are shown in Figure 5.

TSS, TURBIDITY, AND SILTATION TMDL

In May 2002, USEPA published total maximum daily loads (TMDLs) for total suspended solids (TSS), turbidity, and siltation for numerous water bodies in the Ouachita River Basin that were listed as impaired for their designated uses, including Big Creek (Figure 2).

This TMDL used ambient data to make calculations for reductions needed to meet guideline criteria for parameters. A reduction of 48% from January – June and a reduction of 7 percent from July – December were required to meet a guideline value of 50 NTU.

Table 1 – Water Quality Interim Criterion for Turbidity

Cause of impairment	Guideline value	Percent reduction	Suspected source of impairment
Turbidity	50 NTU	48% Jan - Jun 7% Jul - Dec	Agriculture

LDEQ'S AMBIENT WATER QUALITY DATA

LDEQ has collected ambient water quality data in Big Creek since 1978; recent ambient data for turbidity is included in the Big Creek WIP. Ambient data for turbidity was collected intermittently on a monthly basis in 1999 and 2005, and in the 2008/2009 (e.g. October 2008 – September 2009), 2012/2013, and 2016/2017 sampling years. The data was collected at AWQN site 0069, which is 7.0 miles northwest of Winnsboro at a bridge on Highway 135. AWQN site 0069 is located at the same coordinates as LDEQ project site 1. This data will also be utilized to compare water quality results of data collected at the 12-digit HUC scale in Big Creek–Cane Bayou-Little Creek and Dry Fork Creek-Bee Bayou.

Figure 3 illustrates LDEQ's ambient data by season from 1999 – 2017 for AWQN site 0069. Statements about annual average values, exceedances, and peak concentrations have been included, since these values are relevant for the primary parameter of concern in the watershed.

There is currently no numeric turbidity criterion for Big Creek; however, until a regulatory numeric criterion for Big Creek can be established, according to LDEQ Standards and Assessment staff, the guideline turbidity value in Louisiana waters of 50 nephelometric turbidity units (NTU) may be required for removing the turbidity impairment. In order to restore the designated use for turbidity, no more than 30% of samples collected on a monthly to near-monthly basis can exceed this value of 50 NTU.

The mean annual value for turbidity was 64.2 NTU in 1999; four of 11 values were above the guideline turbidity value of 50 NTU. The mean annual value for turbidity was 43.5 NTU in 2005, with one of 10 months above the guideline value. The mean rose to 59.7 NTU in 2008/2009, with six months out of 12 above the guideline value. The mean for 2012/2013 - 57.7 NTU - was similar; five of the 12 months were above the guideline value. The mean for 2016/2017 was

112.8 NTU; six of the 11 values were above the guideline value. The highest mean monthly concentration occurred in May; the lowest monthly mean occurred in September. None of the five values exceeded the guideline value from July through October. The two highest values were 320 NTU in May 2017 and 252 NTU in December 2008. The lowest value (NONDETECT) occurred in September 2013.

Record flooding occurred in March 2016 in northeast Louisiana (including Big Creek watershed) due to extreme storm events. The watershed was part of a federally declared disaster area.

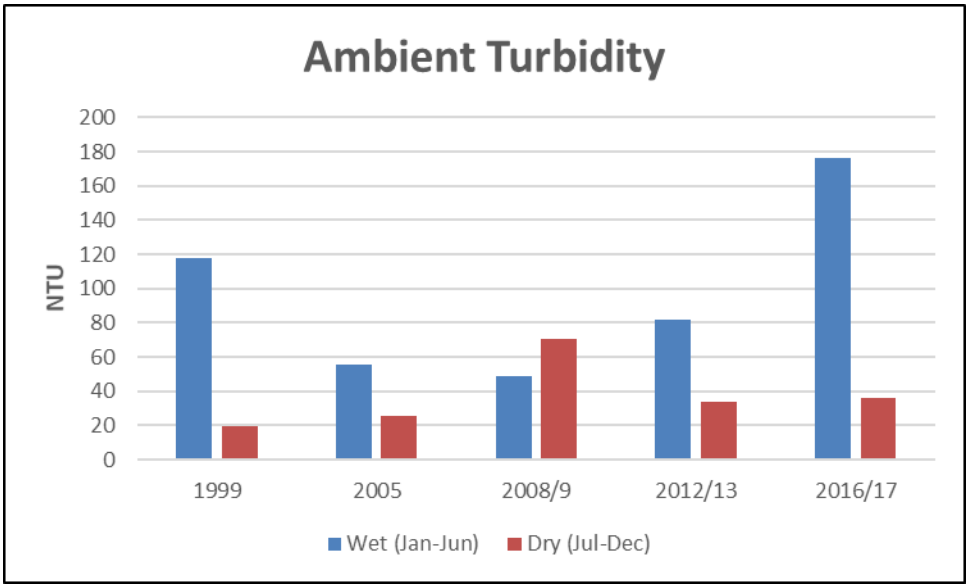


Figure 3 – LDEQ Seasonal Ambient Turbidity Means

Seasonal means (Figure 3) are the means of monthly values for the wet season (January – June), and the dry season (July – December). The ambient data indicate that higher concentrations of turbidity typically occur during the wet season. Reducing these peak concentrations would help to restore the FWP designated use in Big Creek.

In addition to analyzing ambient water quality data, LDEQ conducted additional sampling to address data gaps (Element I), and employed a watershed model to identify critical and priority areas of high NPS loading in Big Creek.

MODELING BIG CREEK

LDEQ utilized the Soil and Water Assessment Tool (SWAT) model for Big Creek to identify areas with a high suspected sediment yield. SWAT uses land use, soil type, elevation, and climate data to model pollutant loads delivered to a watershed.

The SWAT model delineated a HUC-12 unit in the Big Creek watershed into 35 subbasins and calculated a value for suspected sediment yield in tons/acre/year for each subbasin. Yield

values for each subbasin were categorized as low, medium, or high, and then mapped (Figure 5). This map was distributed to partners to assist in the ranking process for BMP implementation. Producers with land in the high yield areas (colored red) were assigned more point in the process.

CORN AND SOYBEANS

The fall discharges are relatively clean outflows with relatively low concentrations of sediment leaving the fields, though excessive soil erosion is currently occurring on cropland. Implementation of agricultural BMPs through USDA Farm Bill programs and LDAF Section 319 programs may reduce sediment levels in the Big Creek watershed. Implementation of site-specific BMPs to control runoff and reduce sediment loads are key actions recommended to reduce turbidity levels in the watershed.

The implementation strategy includes irrigation land leveling, grade stabilization structures, cover crop, precision land forming, and irrigation pipeline. These practices are implemented as part of a system, where each practice has an additive effect on the improvement of water quality. As these agricultural BMPs are implemented on the croplands, concentrations of turbidity should decline.

Figure 4 shows the projected decrease in turbidity due to implementation. Beginning with a value of 96 NTU in the TMDL, reductions will occur each year until the guideline value of 50 NTU is met.

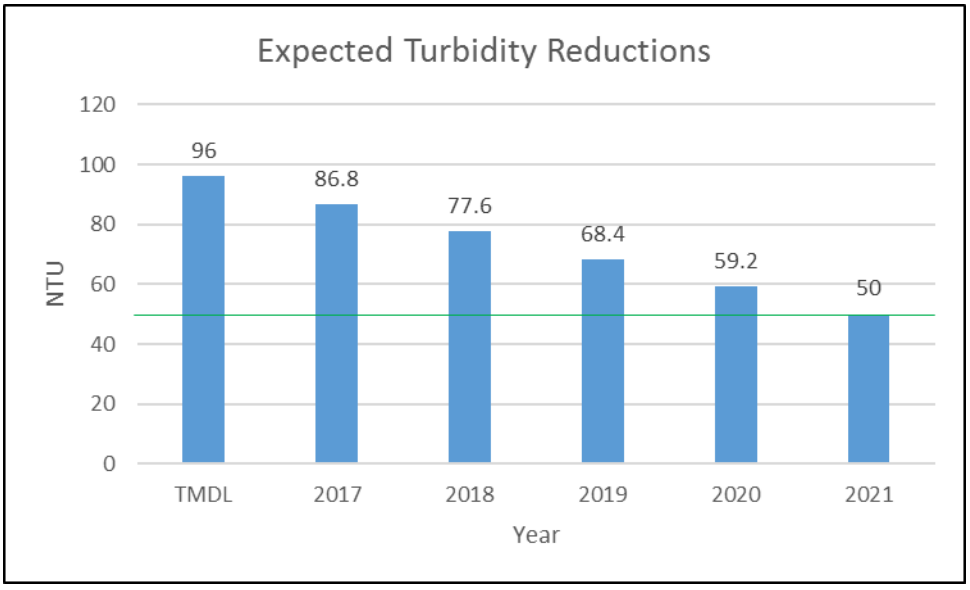


Figure 4 – Big Creek Turbidity Reductions

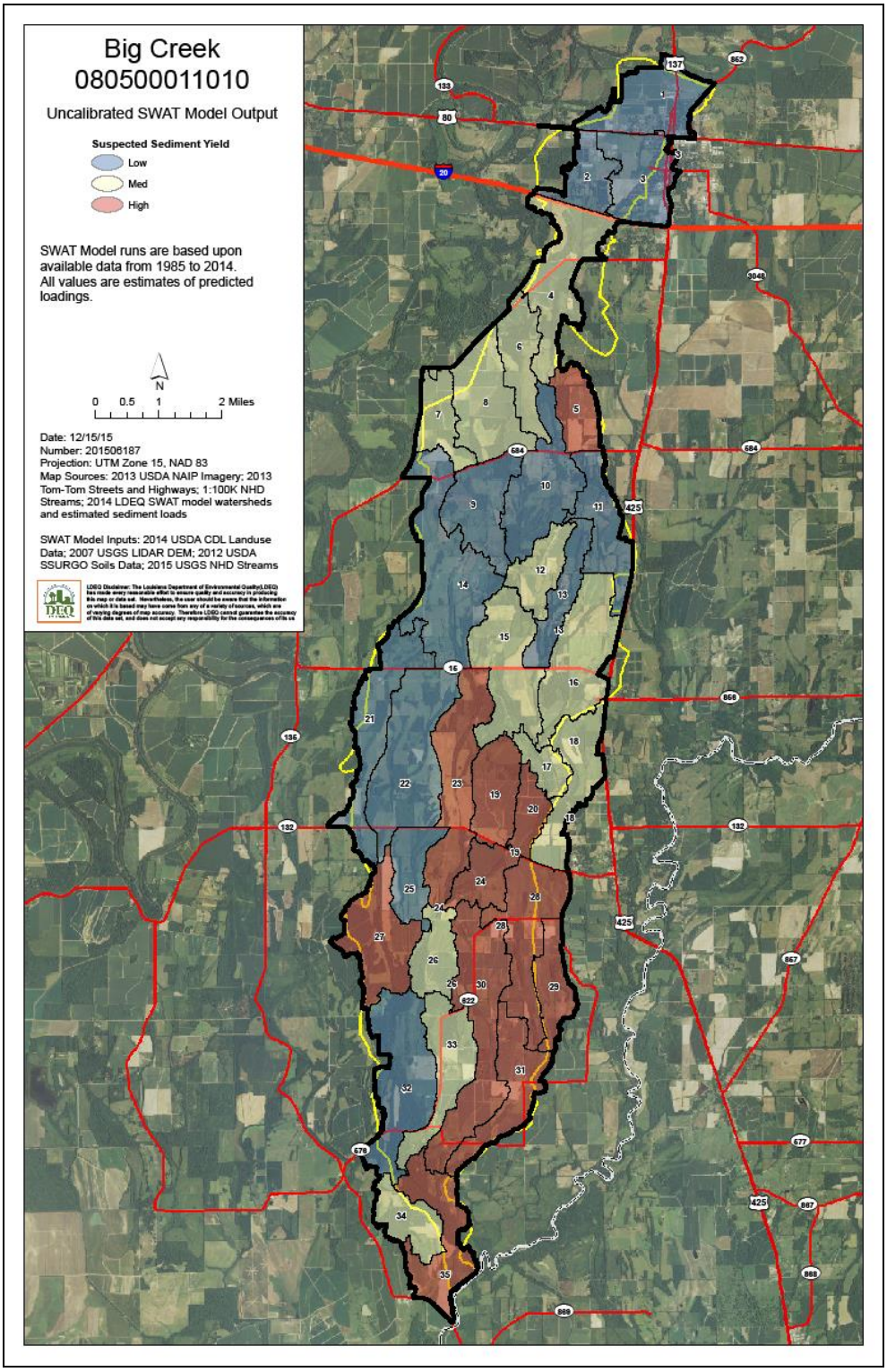


Figure 5 – Big Creek SWAT Model Output

B. ESTIMATED LOAD REDUCTIONS ACHIEVED WITH NPS BMPS

The primary agricultural crops in Big Creek watershed are soybeans and corn. A problem related to production of these crops is excessive runoff that contributes to higher concentrations of turbidity.

Accurate quantification of pollutant loads that contribute to high turbidity can be difficult, given the variability of factors (slope, soil type, tillage, etc.) within the watershed. LDEQ employed the STEPL model to calculate sediment loads and reductions due to BMP implementation. Louisiana was selected for State, Richland was selected for County, and _LA-Richland_Mean was selected for Weather Station. Modeled results for STEPL-relevant BMPs that have already been implemented by LDAF are included in Table 2. Table 2 includes load reduction estimates expected in the two 12-digit HUCs targeted through LDAF implementation; more reduction may be needed.

Table 3 shows BMPs implemented by LDAF as part of this project; data for STEPL-relevant BMPs from Table 3 was input to the STEPL model, and sediment load and reduction values were generated.

Table 2 – Load Reduction Estimates for Big Creek

Watershed (LDEQ subsegment)	BMP	Acres	Sediment load without BMP (tons/year)	Sediment load with BMP (tons/year)	Percent sediment reduction
Big Creek (080903)	Cover Crop	74.8	167.9	151.1	10.0
	Precision Land Forming	244.77	456.2	300.6	34.1

Note: Contour Farming was selected in the STEPL model for Precision Land Forming, and Cover Crop 2 was selected for Cover Crop. Grade Stabilization Structures affected 65 acres; assuming an annual 1.5 ton/acre/year reduction, a reduction of 97.5 tons of sediment per year is achieved.

C. BMPS FOR IMPLEMENTATION IN BIG CREEK WATERSHED

USDA-NRCS has implemented agricultural BMPs in Big Creek during fiscal years 2005 - 2017. Appendix A includes numbers of contracts for each practice that was implemented from 2005 - 2017 in each 12-digit HUC in Big Creek watershed.

LDAF utilizes a ranking criterion to prioritize farms adjacent to the bayou for BMP implementation. They believe a reduction of NPS pollutants can be accomplished by implementing BMPs such as cover crops, irrigation water management, grade stabilization structures, irrigation land leveling, irrigation pipeline, and other practices to protect water quality in this subsegment.

Since water quality data indicates that sediment needs to be reduced during the cooler months and land-use data indicates that corn and soybeans are the predominant cropping system in the watershed, management measures or BMPs that reduce sediment from these land uses are prioritized for watershed implementation.

Grade stabilization structures stabilize the grade and control erosion to prevent the formation or advance of gullies, and enhance environmental quality and reduce pollution. A grade stabilization structure allows sediments to settle in flooded fields and prevents erosion through the graded/slow release of water.

Irrigation land leveling reshapes the surface of the field to facilitate the efficient use of water on irrigated land, especially in rice and crawfish production. Fields are surveyed and designed as part of an overall farm irrigation system within slope limits for efficient floodwater application and erosion control. Irrigation land leveling may be used in conjunction with Grade Stabilization Structures.

Cover crops are crops (such as grasses and legumes) which are planted to preserve topsoil. Cover crops protect and improve soil in a number of ways, including reducing erosion, increasing organic matter, improving nutrient efficiency, and managing soil moisture.

Precision land forming reshapes the surface of the land to specific grades. Precision land forming
Improves surface drainage and controls erosion.

Irrigation pipelines efficiently deliver water from a source to application points. The pipelines reduce erosion, conserve water, and protect water quality.

Table 3 shows BMPs that LDAF has implemented in Big Creek as of March 2018.

Table 3 – BMPs Implemented by LDAF in Big Creek as Part of their Project

NRCS code	Practice name	Amount applied	Unit
340	Cover Crop	74.8	acres
410	Grade Stabilization Structure	8	structures
430	Irrigation Pipeline	21,538	feet
462	Precision Land Forming	244.77	acres
464	Irrigation Land Leveling	519.22	acres

D. AN ESTIMATE OF THE TECHNICAL AND FINANCIAL ASSISTANCE, AND/OR ASSOCIATED COSTS AND AUTHORITIES NECESSARY TO IMPLEMENT THE WIP

LDAF/OFFICE OF SOIL AND WATER CONSERVATION (OSWC) will provide technical assistance to program participants with the OSWC field staff and local Soil and Water Conservation District technicians. The LDAF/OSWC will be the lead agency for BMP implementation. They will provide project management on a day-to-day basis, assist in developing and implementing BMPs, and provide cost-share reimbursement to project participants. LDAF/OSWC will track the rate and extent of BMP implementation within each project watershed and identify where BMPs have been implemented.

USDA-NRCS will offer landowners financial, technical and educational assistance to implement conservation practices on privately owned land to reduce soil erosion, improve water quality, and enhance cropland, forested land, wetlands, grazing lands and wildlife habitat.

THE ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP) was established in the 1996 Farm Bill to provide a voluntary conservation program for farmers and ranchers who face serious threats to soil, water, and related natural resources. Nationally, it provides educational assistance primarily in designated priority areas. About half of the program is targeted towards livestock related natural resource concerns and the remainder goes to other significant conservation concerns.

EQIP offers five contracts that provide incentive payments and cost-sharing for conservation practices called for in the site-specific conservation plan. All EQIP activities must be carried out according to a conservation plan that is site-specific for each farm or ranch. Producers can develop these plans with help from USDA-NRCS or other service providers.

Cost-sharing may pay up to 75 percent of the costs of certain conservation practices important to improving and maintaining the health of natural resources in the area. Incentive payments may be made to encourage a producer to perform land management practices such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management.

Technical assistance will be provided to landowners and operators in the implementation of BMPs and resource management system plans. Follow-up assistance for the duration of the projects will come on an as-needed basis. Federal cost-share assistance will be provided to farmers that implement BMPs, while the landowner or operator will provide matching funds.

THE CONSERVATION STEWARDSHIP PROGRAM (CSP) is for working lands. It is the largest conservation program in the United States. This program allows a landowner to develop a custom program to increase productivity and land value. It can assist with various types of projects, such as cover crops, forest management, and no-till planting.

THE CONSERVATION RESERVE PROGRAM (CRP) provides technical and financial assistance to eligible landowners to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. CRP encourages landowners to convert highly erodible cropland and other environmentally sensitive areas to permanent cover,

THE CONSERVATION RESERVE ENHANCEMENT PROGRAM (CREP) Is an offshoot of the Conservation Reserve Program (CRP), the country's largest private-land conservation program. Administered by the Farm Service Agency (FSA), CREP targets high-priority conservation issues identified by local, state, or tribal governments or non-governmental organizations. In exchange for removing environmentally sensitive land from production and introducing conservation practices, farmers, ranchers, and agricultural landowners are paid an annual rental rate.

LDEQ will work closely with LDAF/OSWC to identify high priority areas in the watershed, assess the project plan and implementation schedules, and coordinate state 319 program components with LDAF program efforts. LDEQ's Water Surveys group will conduct water quality monitoring.

The Northeast, West Carroll, and Boeuf River **Soil & Water Conservation Districts** (SWCDs) will contact and work with project participants at the local level. Louisiana SWCDs operate under the administrative authority of the LDAF/OSWC.

LDEQ spends approximately $61,930 per year on the Big Creek project (Table 4), and Table 5 shows LDAF's budget for the entire Big Creek project period.

Table 4 – Big Creek Approximate Annual Project Budget for LDEQ

Budget Category	Federal
NPS Personnel	$40,000
Water Surveys Personnel	$19,050
Laboratory Analysis	$2,880
TOTAL	**$61,930**

Table 5 – Big Creek Total Project Budget for LDAF

Budget Category	Federal	Match	Total
SWCD Board -2015	$2,500	$2,500	$5,000
SWCD Staff - 2015	$85,000	$0	$85,000
Contractual - 2015	$346,166	$382,992	$729,157
Supplies/Equipment - 2015	$10,000	$0	$10,000
TOTAL - 2015	**$443,666**	**$385,492**	**$829,158**
SWCD Board -2016	$2,500	$2,500	$5,000
SWCD Staff – 2016	$85,000	$0	$85,000
Contractual – 2016	$346,166	$382,992	$729,157
Supplies/Equipment - 2016	$10,000	$0	$10,000
TOTAL - 2016	**$443,666**	**$385,492**	**$829,158**
SWCD Board -2017	$0	$0	$0
SWCD Staff – 2017	$0	$0	$0
Contractual – 2017	$250,000	$250,000	$500,000
Supplies/Equipment – 2017	$5,000	$0	$5,000
TOTAL - 2017	**$255,000**	**$250,000**	**$505,000**
SWCD Board -2018	$0	$0	$0
SWCD Staff – 2018	$0	$0	$0
Contractual – 2018	$250,000	$250,000	$500,000
Supplies/Equipment – 2018	$5,000	$0	$5,000
TOTAL - 2018	**$255,000**	**$250,000**	**$505,000**

E. AN EDUCATIONAL-OUTREACH COMPONENT

Stakeholder participation is a necessary component of any successful WIP, and watershed stakeholders will be encouraged to get involved in the effort to reduce NPS pollutant loads in the watershed. Partners collaborated with stakeholders during the development of this plan; information was shared with LDEQ personnel.

Educational outreach should include educational materials such as flyers and brochures. An educational program should be conducted by LDAF to increase awareness of NPS pollution problems and issues associated with agricultural activities within the Big Creek watershed. The

concept of water quality standards/designated use impairment is a component of outreach, and information about restoration of designated uses is emphasized.

An agricultural BMP field day will be held within the watershed to discuss the TMDL process and to demonstrate to producers and landowners the potential for reducing NPS loads from agricultural activities through implementation of BMPs. LDAF, USDA-NRCS and SWCD staff will meet with potential program participants to discuss various BMPs to reduce agriculture-related NPS pollutants. A special effort will be made to encourage landowners and operators to participate in environmental education events, to attend field days, and become Certified Louisiana Master Farmers.

In addition to field days and educational materials, LDEQ will partner with USDA and LDAF to host one to two meetings each year regarding the watershed to discuss progress made in BMP implementation and water quality data collection. A summary of water quality data will be presented at these meetings to allow landowners and producers an opportunity to see how their participation in the programs is affecting water quality in each of the subwatersheds being monitored through the project. NRCS authorization, design, operation and maintenance forms, and contracts and plans are being signed and adhered to by the operators/landowners implementing the practices.

F. A SCHEDULE FOR IMPLEMENTING BMPS

USDA-NRCS and LDAF have implemented agricultural BMPs in Bayou Lafourche watershed for years. Table 3 includes acreages and numbers for these practices offered by LDAF that were implemented by producers and landowners in Big Creek watershed. Appendix A shows types and numbers of BMP contracts implemented by USDA-NRCS since 2005.

LDAF is currently implementing BMPs in priority subwatersheds of Big Creek in cooperation with LDEQ, USDA-NRCS, and local SWCDs. LDAF is working with the producers to prepare Resource Management System (RMS) plans that address all resource concerns on the farm and meet the desired level of pollution abatement on each tract of cropland selected for project implementation. Each plan will be developed under a three-year contract and tracked accordingly. Tables 6 and 7, respectively, show project timelines for LDEQ and LDAF.

Table 6 – Big Creek Project Timeline for LDEQ

Task	Description	Timeline
1	Submit QAPP to USEPA	Approved Jan. 2016
2	Explore watershed and identify important features, flow points, etc.	Completed Jun. 2015
3	Procure necessary supplies and test all field equipment	Completed Jan. 2016
4	Baseline monitoring	Began Feb. 2016
5	Long-term monitoring	Began 2016
6	Perform statistical analysis and interpret data	Quarterly
7	Update SAP/WIP	Annually
8	Prepare draft final report for submission to USEPA	End of Project
9	Submit QAPP to USEPA	Approved Jan. 2016
10	Explore watershed and identify important features, flow points, etc.	Completed Jun. 2015

Table 7 – Big Creek Project Timeline for LDAF

Task	Description	Timeline
1	Develop Ranking Criteria	Oct. 2015 – Dec. 2015
2	Selection of BMPs and Participants	Oct. 2015 – Dec. 2015
3	Meet with Potential Participants	Jan. 2015 – Oct. 2016
4	Prepare Individual Comprehensive BMP Plans	Jan. 2015 – Oct. 2016
5	Technical Assistance	Jan. 2016 – Sep. 2020
6	Cost Share Assistance	Oct. 2015 – Sep. 2020
7	Education Program	Jul. 2017 – Jun. 2020
8	Continue BMP Implementation	Jul. 2017 – Sep. 2020
9	Semi-Annual Reports	Jan. 2016 – Sep. 2020
10	Annual Reports	Oct. 2015 – Sep. 2020

G. A DESCRIPTION OF INTERIM, MEASURABLE MILESTONES OR OTHER CONTROL ACTIONS BEING IMPLEMENTED

Annual reporting on progress in BMP Implementation by LDAF and NRCS is one of the interim indicators of successful project implementation.

The short-term goal of this WIP is to implement BMPs and related conservation practices in HUC-12 areas in Big Creek watershed, and monitor water quality parameters to evaluate their effects on improving water quality. The long-term goal of the WIP and NPS projects is water quality improvement in the watershed to the point where the FWP designated use for Big Creek can be restored.

Project milestones are listed in Table 8. The sampling plan was approved in January 2014; long-term monitoring began later that year and should continue through 2022. Project data is entered into the Grants Reporting and Tracking System (GRTS) semi-annually throughout the project. LDAF began implementing BMPs for the project in 2016, and they plan to continue through 2021. NRCS has been implementing BMPs for more than a decade, and could continue through the project period. The IR is published in even-numbered years, so Bayou Lafourche could be delisted for FWP in 2020.

Table 8 – Big Creek Project Milestones

Project Milestones	2014	2015	2016	2017	2018	2019	2020	2021	2022
QAPP approved									
Long-term monitoring									
GRTS reporting									
LDAF BMP implementation									
NRCS BMP implementation									
Water body possibly delisted for turbidity									

H. A SET OF CRITERIA TO DETERMINE WHETHER LOAD REDUCTIONS ARE BEING ACHIEVED OVER TIME AND WHETHER SUBSTANTIAL PROGRESS IS BEING MADE TOWARD MEETING WATER QUALITY STANDARDS

This section summarizes benchmarks used to determine progress and long-term success.

Data collected from water quality monitoring will be used to determine whether NPS loads are improving over time and progress is being made toward meeting water quality standards. Success will be determined using water quality data sampled at the ambient monitoring location measured against Louisiana's water quality criteria to assess the watershed's use support restoration. LDEQ formally assesses use support every two years and publishes this assessment in its biannual Integrated Report. The LDEQ water quality standard used to assess use support in this subsegment is a 50 NTU guideline value for turbidity.

Continued sampling throughout the watershed will serve as a feedback mechanism and provide information needed for any plan adjustments in the future. Turbidity data will be analyzed and compared to milestones in the previous section to assess progress. An additional measure of progress will be the yearly increase of acres participating in BMPs. Associated reductions may be estimated using STEPL. Acreages and modeled reductions will be compared against milestones in the previous section to determine progress. Information from stakeholders will augment this information. Corrective action will be taken with partner and stakeholder input to adjust planned activities as indicated.

I. A MONITORING COMPONENT TO EVALUATE EFFECTIVENESS OF IMPLEMENTATION EFFORTS

This section describes the purpose, method, sites, parameters, and schedule of water quality monitoring that will support this plan.

The purpose of water quality monitoring in Big Creek is to characterize water quality issues throughout the watershed, to help identify geographic areas contributing high NPS runoff, to provide information for strategy adjustments, and to provide a quantitative tracking of water quality before, during, and after education, outreach, and BMP implementation.

Water quality monitoring at the ambient site in Big Creek (AWQN site number 0069) occurs on a four-year rotation and determines use support. Through CWA Section 319(h) funding, LDEQ Water Surveys personnel collect water quality samples for LDEQ NPS at site 0069 and 29 additional locations throughout the watershed. LDEQ Water Surveys personnel collect field parameters (dissolved oxygen, specific conductivity, pH, water temperature); a laboratory parameter (turbidity) on a once per month basis. Field data sheets are completed at each sampling event and a NPS site characterization form was completed initially and will be completed as needed. This information will aid in determining water flow conditions at the time of sampling, and changes with respect to the area near the sample site. Data and project

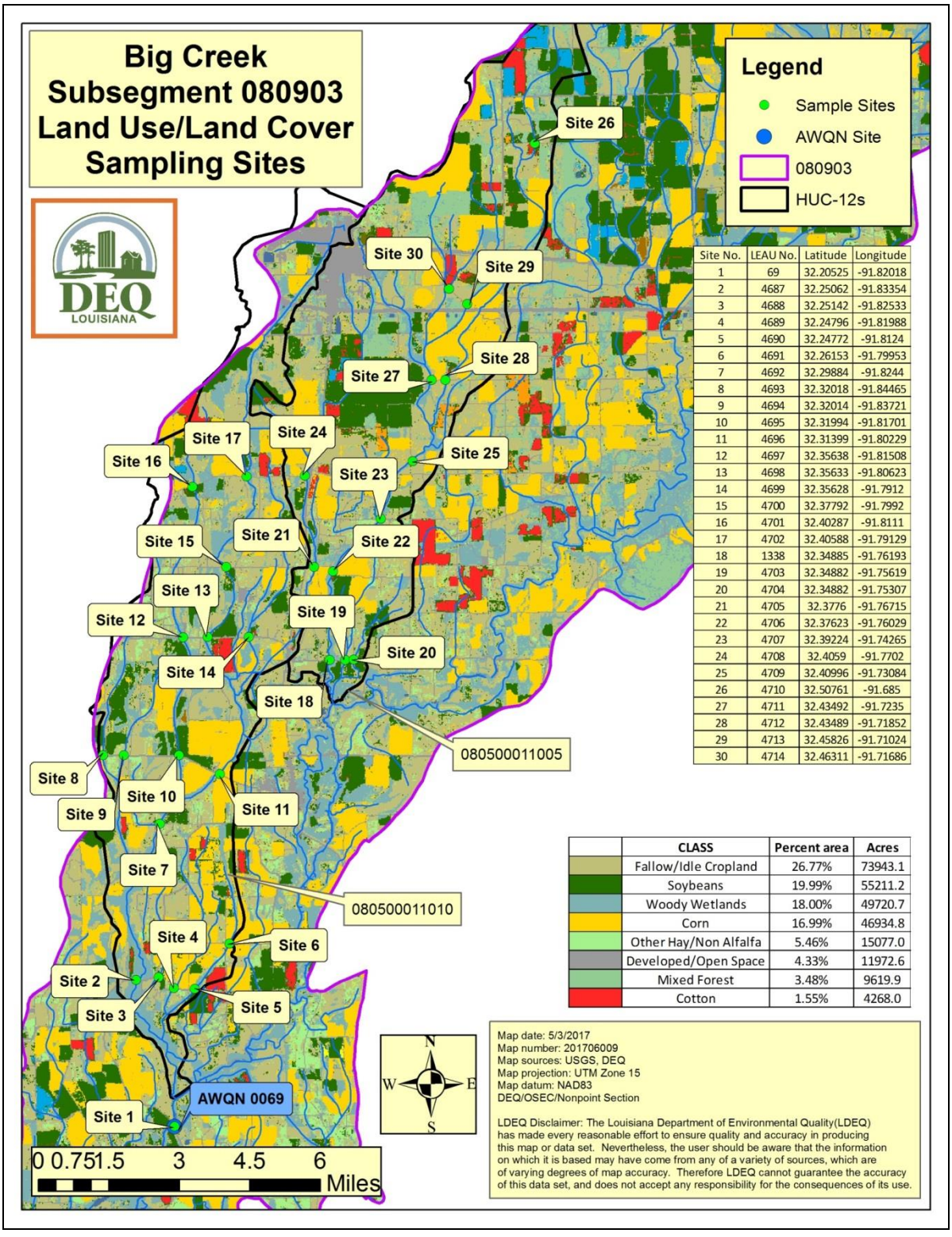
progress are shared with stakeholders throughout the project term through presentations, stakeholder meetings, and outreach events.

NPS water quality data is used to identify priority areas for BMP implementation and track changes over time before, during, and after BMP implementation. NPS water quality data may be used for assessment. Data collection and analysis occur under EPA-approved QAPP #3050 and the current EPA-approved sampling plan. The USEPA QTRAK# for the current sampling plan is 16-111.

Figure 6 shows sampling sites where monitoring is occurring in this project. Data was collected at sites 1 - 30 from February 2016 to the present. Project sampling site 1 is located at the same coordinates as AWQN site 0069.

Figure 7 is a map of percent exceedances for sample sites in this project. Percent exceedances were calculated by dividing the number of exceedances by the number of events. Percent exceedance values ranged from 18.2 percent to 65.9 percent. As of September 2018, laboratory parameter data for turbidity for 52 sampling events was available.

Table 9 shows the mean value, exceedances, and percent exceedances for each sampling site. No site had data collected for all 52 events. Between six (Sites 14, 19, and 20) and 29 (Sites 16 and 23) exceedances occurred for each site over the 52 sampling events. Values ranged from 1.4 to 2000 NTU. Values for turbidity often exceeded the criterion (50 NTU) that will be needed at AWQN site 0069 to restore Big Creek for turbidity.



Site No.	LEAU No.	Latitude	Longitude
1	69	32.20525	-91.82018
2	4687	32.25062	-91.83354
3	4688	32.25142	-91.82533
4	4689	32.24796	-91.81988
5	4690	32.24772	-91.8124
6	4691	32.26153	-91.79953
7	4692	32.29884	-91.8244
8	4693	32.32018	-91.84465
9	4694	32.32014	-91.83721
10	4695	32.31994	-91.81701
11	4696	32.31399	-91.80229
12	4697	32.35638	-91.81508
13	4698	32.35633	-91.80623
14	4699	32.35628	-91.7912
15	4700	32.37792	-91.7992
16	4701	32.40287	-91.8111
17	4702	32.40588	-91.79129
18	1338	32.34885	-91.76193
19	4703	32.34882	-91.75619
20	4704	32.34882	-91.75307
21	4705	32.3776	-91.76715
22	4706	32.37623	-91.76029
23	4707	32.39224	-91.74265
24	4708	32.4059	-91.7702
25	4709	32.40996	-91.73084
26	4710	32.50761	-91.685
27	4711	32.43492	-91.7235
28	4712	32.43489	-91.71852
29	4713	32.45826	-91.71024
30	4714	32.46311	-91.71686

	CLASS	Percent area	Acres
	Fallow/Idle Cropland	26.77%	73943.1
	Soybeans	19.99%	55211.2
	Woody Wetlands	18.00%	49720.7
	Corn	16.99%	46934.8
	Other Hay/Non Alfalfa	5.46%	15077.0
	Developed/Open Space	4.33%	11972.6
	Mixed Forest	3.48%	9619.9
	Cotton	1.55%	4268.0

Figure 6 – Big Creek Sampling Sites

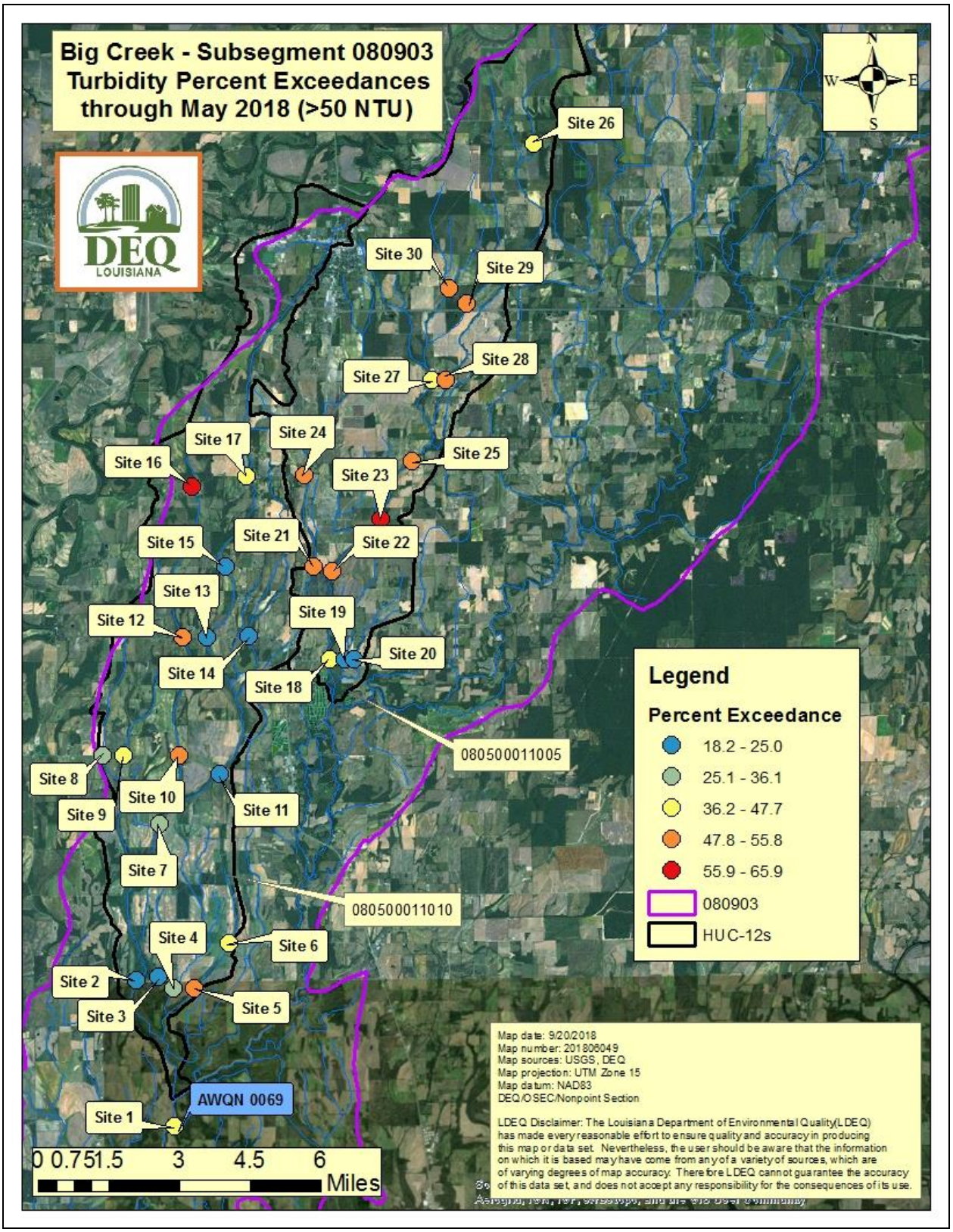


Figure 7 – Big Creek Turbidity Exceedances

Table 9 – Big Creek Turbidity Data

Sampling Site	Events	Mean (NTU)	Exceedances	Percent Exceedance
1	44	91.5	21	47.7
2	48	46.1	12	25.0
3	33	62.0	8	24.2
4	38	63.7	12	31.6
5	34	109.6	17	50.0
6	48	115.7	21	43.8
7	50	38.4	15	30.0
8	36	60.6	13	36.1
9	40	63.6	19	47.5
10	43	61.3	21	48.8
11	50	47.3	11	22.0
12	31	70.1	16	51.6
13	43	58.4	10	23.3
14	33	30.9	6	18.2
15	42	42.6	10	23.8
16	46	96.0	29	63.0
17	48	88.8	22	45.8
18	49	71.9	22	44.9
19	33	40.4	6	18.2
20	25	40.6	6	24.0
21	48	96.1	25	52.1
22	48	79.5	24	50.0
23	44	90.8	29	65.9
24	49	96.9	26	53.1
25	47	73.6	24	51.1
26	48	66.7	20	41.7
27	50	59.5	23	46.0
28	43	71.8	24	55.8
29	47	60.2	23	48.9
30	43	66.7	22	51.2

3. TRACKING PROGRESS OF WATERSHED IMPLEMENTATION

LDEQ's NPS staff continues to partner with LDAF and USDA-NRCS through quarterly meetings to discuss progress made in watershed implementation. These quarterly meetings will include progress made on BMP implementation in the Big Creek watershed, as well as current status of water quality data collected at the subwatershed scale. If water quality data indicates improvement has occurred after BMP implementation, then LDEQ, LDAF, and USDA-NRCS will continue their current approach with respect to watershed implementation. If water quality data does not indicate improvement, then LDEQ, LDAF, and USDA will determine what type of corrective actions should be made with respect to watershed implementation. If water quality data indicate water quality standards have been met in Big Creek, the waterbody will be delisted and a NPS success story will be developed and submitted to USEPA Region 6.

4. REFERENCES

Louisiana's Nonpoint Source Management Plan, 2012.

TOTAL MAXIMUM DAILY LOAD (TMDL)
For TSS, Turbidity, and Siltation for the Ouachita River Basin, 2002.

United States Department of Agriculture-National Resources Conservation Service. (November 16, 2018). USDA-NRCS Field Office Technical Guide. https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/

United States Department of Agriculture-National Resources Conservation Service. (November 19, 2018). USDA-NRCS Conservation Stewardship Program https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/

United States Department of Agriculture-National Resources Conservation Service - Maryland. (November 27, 2018). USDA-NRCS Conservation Reserve Program https://www.nrcs.usda.gov/wps/portal/nrcs/detail/md/programs/?cid=nrcs144p2_025631

United States Department of Agriculture- Farm Service Agency. (November 27, 2018). https://www.fsa.usda.gov/FSA/webapp?area=home&subject=lown&topic=cep