JASPER CREEK WATERSHED BASED PLAN

June 30, 2019

Jasper Creek
Watershed Based Plan
HUC 080302010404

Prepared for:

Jasper Creek Watershed Implementation Team

Mississippi Department of Environmental Quality

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EXECUTIVE SUMMARY

The Jasper Creek Watershed (HUC 080302010404) was identified as a priority watershed by the Mississippi Department of Environmental Quality (MDEQ) and the Yazoo River Basin Team. Jasper Creek, the main stem drainage in the watershed, was included on Mississippi's 2006 Section 303(d) List of Impaired Water bodies for biological impairment. The Mississippi Soil and Water Conservation Commission (MSWCC), Union County Soil and Water Conservation District, Tippah County Soil and Water Conservation District and USDA Natural Resources Conservation Service (NRCS) thought a great impact on water quality could be made in this watershed. As a result, the MSWCC submitted a proposal to MDEQ's Section 319 grant program to educate landowners/operators about water quality and measures they could take to help improve the water quality in this watershed along with the installation of Best Management Practices (BMPs) to address water quality concerns. To build partnerships and increase opportunities for conservation practice implementation, the MSWCC worked to assemble a Watershed Implementation Team to address water quality and identify any other concerns within the watershed. As a result of this effort, the Watershed Based Plan (WBP) contained within this document was developed based on input from the watershed team and water quality and conservation professionals.

After the original impairment §303(d) listing in 2006 for biological impairment, an inter-disciplinary group of water quality subject matter experts performed a stressor analysis to identify what pollutant was most likely causing the impairment to the biological community in Jasper Creek. As a result of the stressor analysis, sediment pollution was identified as the cause of the impairment and a TMDL was developed in 2019. Because MS soils have a high phosphorus content and the same BMPs that are used to address sediment are also used to address nutrients; this WBP will address both sediment and nutrient loading in the Jasper Creek Watershed. The goal of this watershed based plan include reducing the nutrients and sediment entering the streams and creeks in the watershed and in response to those reductions restore Jasper Creek to a state where it can attain water quality standards. To improve water quality, one of the management actions undertaken was to implement a Section 319 funded watershed demonstration project within the watershed. The targeted landuse for this project was agricultural lands in Union and Tippah Counties that fell within the watershed boundaries.

The groups that supported the efforts undertaken to educate landowner/operators about water quality and installing BMPs on the landscape included staff from the Union County Soil and Water Conservation District, the Tippah County Soil and Water Conservation District, USDA Natural Resources Conservation Service, and the Mississippi Soil and Water Conservation Commission. The Union County Soil and Water Conservation District and the Natural Resources Conservation Service can be contacted at 662-538-0030 ext. 3 for information and assistance about this project. The Tippah County Soil and Water Conservation District and the Natural Resource Conservation Service can be contacted at 662-837-4464 ext. 3.

Table 1: Jasper Creek Watershed Management Action Plan

Goal	Who	What	Where	When	Contacts
Reduce nutrient and sediment loading to water bodies in the watershed thereby allowing them to meet MS's Fish and Wildlife Support designated use	MSWCC, USDA NRCS, Union County Soil and Water Conservation District, Tippah County Soil and Water Conservation District	Continue existing programs and projects related to landowner/operator education, BMP implementation, and habitat conservation	Entire watershed	2016-2019	Nick Ivy, MSWCC 601-354-7645 Union County NRCS/SWCD 662-538-0030 ext. 3 Tippah County NRCS/ SWCD 662-647-8857 ext. 3
	Local Landowners and operators	Grade Stabilization Structures Streambank and Shoreline Protection Critical Area Planting Heavy Use Area Protection Tank/Trough	Entire Watershed	2016-2019	Local landowners

VISION STATEMENT

The vision of the Jasper Creek Watershed Implementation Team is to improve and/or protect the water quality of streams and creeks in the watershed through the effective management of agricultural and other land use activities. This is a place where people want to live, work, recreate and raise a family and want to make sure the watershed continues to support those activities. Farming is a way of life for many of the landowners in this watershed. They desire to preserve and conserve their natural resources so that future generations can enjoy and utilize the land as they have been able to do.

MISSION STATEMENT

The mission of the Jasper Creek Watershed Implementation Team is to educate landowners on the use and effects of new/innovative best management practices and land use planning methods that will help attain designated water body uses in the watershed.

WATERSHED IMPLEMENTATION TEAM

Members of the Watershed Implementation Team for the Jasper Creek Watershed include the following participants:

Tracy Rodgers- Landowner

Lamar Frazier- Landowner

John Haynes- Landowner

Chris Coombs- Land operator

David Kitchens- Landowner

Gina Wills- Union County Cooperative Extension Service (Extension)

Mark Gilbert- Mississippi Soil & Water Conservation Commission (MSWCC)

Nick Ivy- Mississippi Soil & Water Conservation Commission (MSWCC)

Lee Smith- Mississippi Soil & Water Conservation Commission (MSWCC)

Andy Whittington- Mississippi Farm Bureau Federation (MFBF)

Christy Robinson- Natural Resources Conservation Service (NRCS)

John Estes- Natural Resources Conservation Service (NRCS)

Richard Rebich-United States Geological Survey (USGS)

Patrick Vowell- Mississippi Department of Environmental Quality (MDEQ)

Natalie Segrest- Mississippi Department of Environmental Quality (MDEQ)

The Watershed team members were identified through a collaborative effort between Union County SWCD, Tippah County SWCD, NRCS, MSWCC and MDEQ.

WATERSHED DESCRIPTION

The Jasper Creek watershed consists of approximately 19,657 acres. The land uses for the Jasper Creek Watershed include approximately 6,893 acres of pastureland (35%), 8,017 acres of forestlands (41%), 2,316 acres of cropland (12%), 1,067 acres of urban (5%) and 1,364 acres other (7%). Figure 1 shows the land uses in the Jasper Creek watershed.

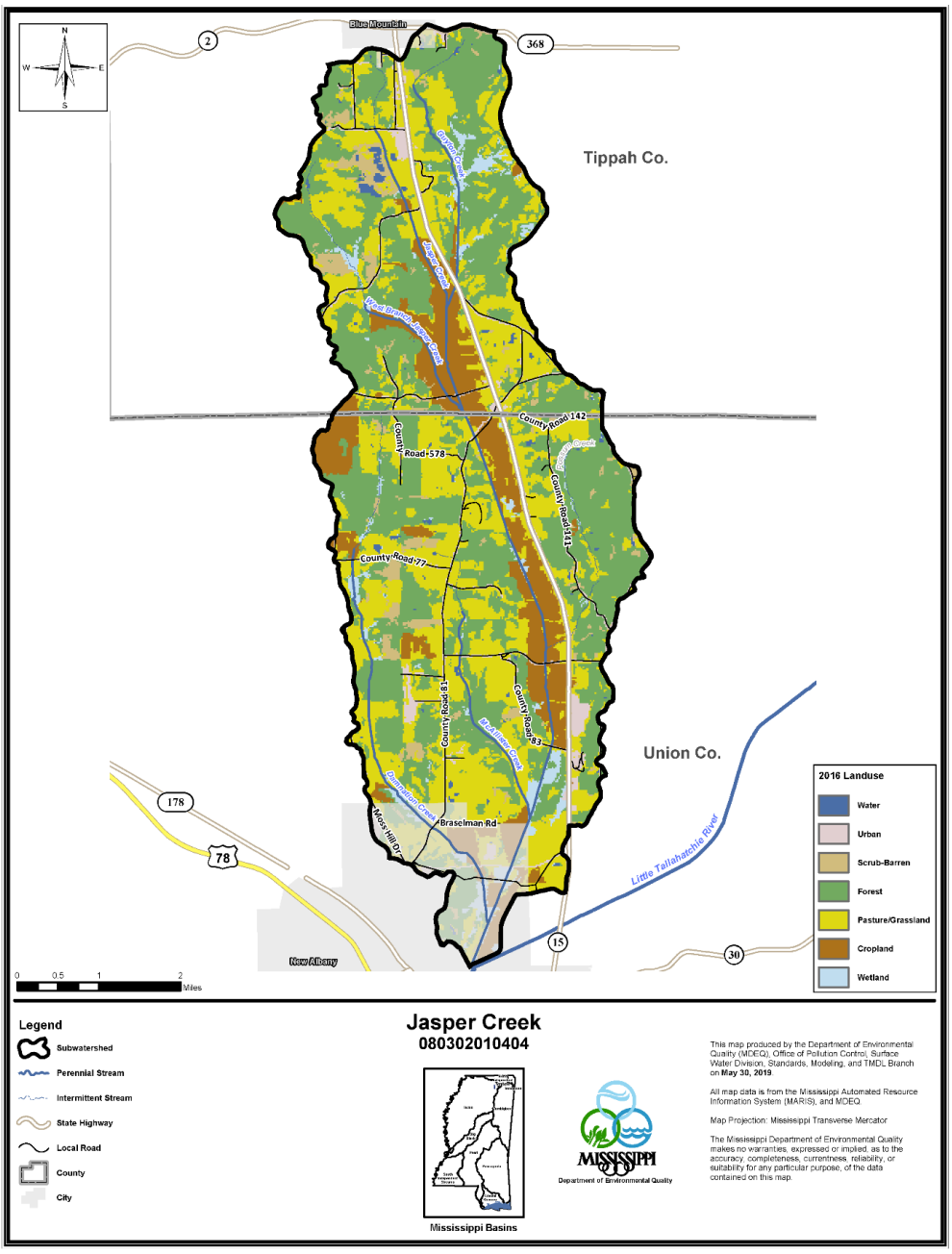


Figure 1: Landuse Map of Jasper Creek Watershed

Jasper Creek is located in the North central portion of Union County, Mississippi and the southwestern portion of Tippah County, Mississippi (Figure 2). This watershed is located in a rural area with a sparse population of about 1,900 to 2,200. Portions of the towns of New Albany and Blue Mountain are located in this watershed. Economic conditions that influence this watershed include the closing of industry jobs and low timber prices. The significant changes in land use in this watershed in the last 20 years are pastureland being converted to cropland. There are no historical events or customs that have affected the culture in the watershed.

Jasper Creek watershed falls within the boundaries of both the Northern Hilly Gulf Coastal Plains (65e) and Flatwoods/Blackland Prairie Margins (65b) ecoregions; however, 90% of the watershed is classified as Flatwoods/Blackland Prairie. This is a transitional region with more forested plains and hills. The flatwoods are mostly forested lowland areas with little slope where the soils are characterized by heavy clay. The Blackland Prairie Margins have a more rolling landscape with more slope but also tend to have heavier clay-like, sticky soils. Oak and hickory along with pine can be found in the forest areas as the dominant vegetation. The Northern Hilly Gulf Coastal Plains ecoregion runs laterally along the eastern boundary of the watershed. With only 1,955 acres of the watershed belonging in this ecoregion, this area is characterized by soils with higher silt and sand content. Most notably in this area, the sands on the surface have weathered into a reddish color. This ecoregion also has a higher density of upland hardwood forests. Predominant soils in the watershed include Mantachie Silt Loam, Jean Silt Loam, Providence, Smithdale, Tippah, Falkner, and Gillsburg associations. These soil types range from nearly flat to rolling hills and have high to very high run-off potential.

Jasper Creek represents the mainstem perennial drainage in the watershed. Near the headwaters of Jasper Creek, Guyten Creek flows into Jasper from the northeastern boundary of the watershed. Other tributaries flowing into Jasper Creek include West Branch Jasper Creek, McAllister Creek, and Damnation Creek. At the mouth of the watershed, Jasper Creek empties into the Little Tallahatchie River. Hell Creek Wildlife Management Area is located partially within the watershed, but there are no other state or federal parks, national forest or other significant environmental management areas within the watershed.

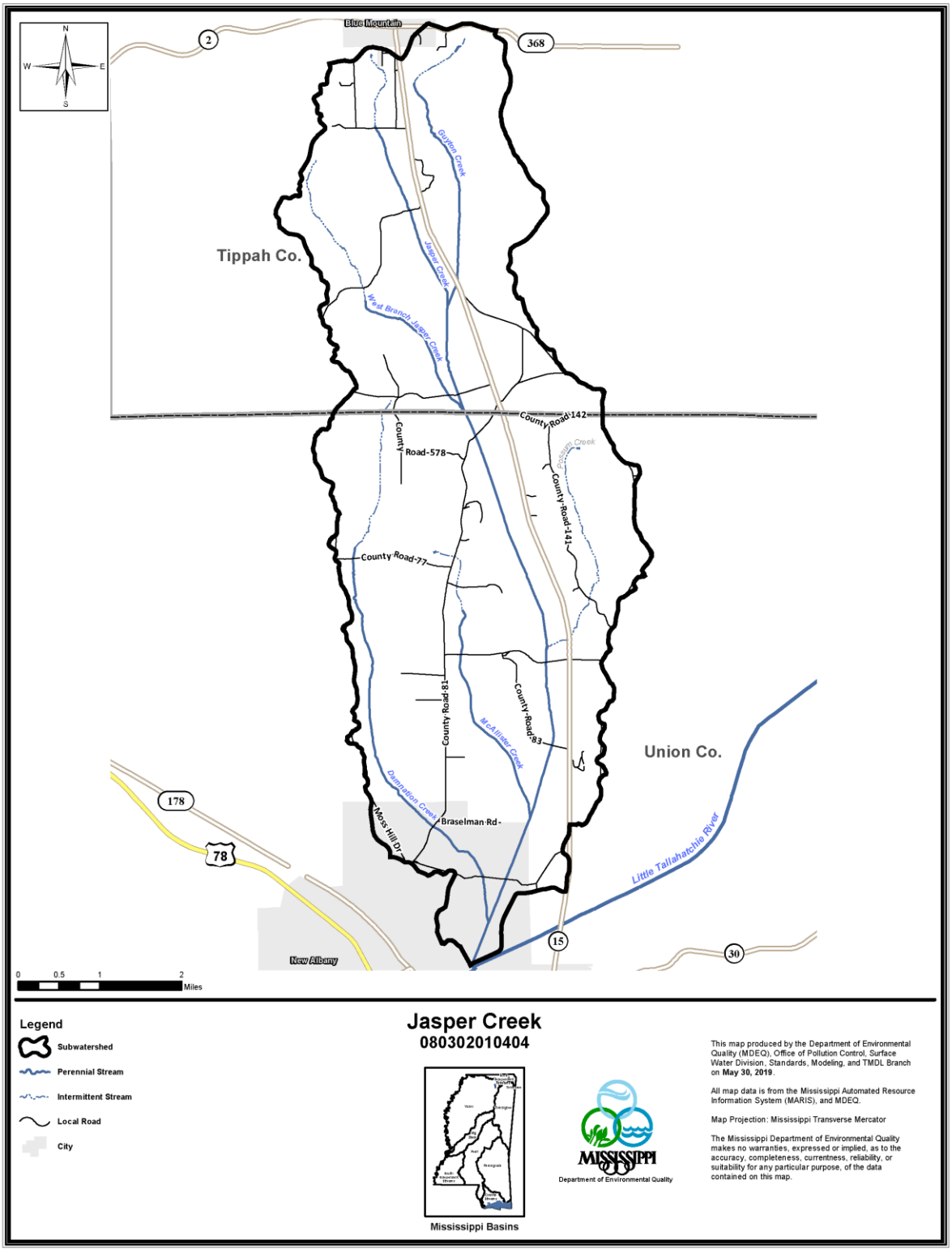


Figure 2: Government Boundary Map: Jasper Creek Watershed

STAKEHOLDER INTEREST

The stakeholders of Jasper Creek want to conserve and preserve the soil, water, and wildlife habitat of this watershed. Farming is a way of life for many in this watershed, and therefore, wanting to conserve and preserve the agricultural lands within the watershed is of utmost importance to stakeholders. Stakeholders want to restore the watershed's creeks and streams to a state of good water quality by reducing runoff (stopping erosion and loss of topsoil) as well as improving wildlife habitats. Sediment and nutrient loading to the waterbodies within the watershed is another concern of the landowners and stakeholders. Although currently, there is little impact from developing areas, stakeholders want to monitor any entities or developments that may have a negative impact on this watershed, and take the necessary actions to prevent them. Stakeholders have also witnessed trash and household appliances that have been discarded into the creeks and streams, which retard the flow of water, causing flooding. Once the floodwaters recede, topsoil is washed away causing sedimentation and nutrient loading from the eroded topsoil. Within this watershed, landowners note that there are numerous tile drains and culverts that have failed either due to collapse or improper installation, and believe that this is contributing to much of the nonpoint source pollution within this watershed. This problem occurs fairly consistently throughout the watershed, and is not concentrated in one particular area. Because of this, the problem is considered to be expansive and affects the majority of this watershed.

The stakeholders believe that educating landowners about the effectiveness of best management practices, and implementation of these best management practices within the watershed will greatly improve water quality in the Jasper Creek Watershed.

WATER RESOURCES

History of Activity in the Watershed

The primary partners in restoration and /or conservation efforts in the Jasper Creek Watershed have been the Natural Resources Conservation Service, the Union County Soil and Water Conservation District, the Tippah County Soil and Water Conservation District, and the Mississippi Soil and Water Conservation Commission. Local landowners and operators have also played a major role in the restoration and conservation of the natural resources in this watershed by installing best management practices on their land. Several environmental and agricultural conservation programs have been utilized by landowners in the watershed in past years. These programs include the Environmental Quality Incentive Program (EQIP) and Conservation Reserve Program (CRP). These programs, funded by USDA, have helped many landowners implement conservation practices on the ground while reducing soil loss, enhancing wildlife habitat, improving water quality, increasing agriculture and silviculture production, and promoting conservation education.

Wildlife and Fisheries

There are important recreational species located throughout the watershed. These species include deer, turkey, bass, catfish, bream, rabbits, squirrel, and raccoon. Also, trapping is an important recreation that takes place in this watershed. The list of plants and animals of special concern are provided below for Union and Tippah Counties. There are no animals and plants that are threatened or endangered in this watershed.

Table 2: Animals of Special Concern in Union County

Scientific Name	Common Name
Aimophila aestivalis	Bachman's Sparrow
Alligator mississippiensis	American Alligator
Anodontoides radiatus	Rayed Creekshell
Cyprinella spiloptera	Spotfin Shiner
Cyprinella whipplei	Steelcolor Shiner
Etheostoma raneyi	Yazoo Darter
Leptodea fragilis	Fragile Papershell
Ligumia subrostrata	Pondmussel
Staphylea trifolia	American Bladdernut
Uniomerus tetralasmus	Pondhorn
Ursus americanus	Black Bear
Villosa lienosa	Little Spectaclecase

Table 3: Animals of Special Concern in Tippah County

Scientific Name	Common Name
Arigomphus villosipes	Unicorn Clubtail
Cyprinella whipplei	Steelcolor Shiner
Etheostoma raneyi	Yazoo Darter
Gomphus modestus	Gulf Coast Clubtail
Noturus gladiator	Piebald Madtom
Ophisaurus attenuatus	Slender Glass Lizard
Procambarus ablusus	Hatchie River Crayfish
Stylogomphus albistylus	Eastern Least Clubtail
Stylurus laurae	Laura's Clubtail
Tachopteryx thoreyi	Gray Petaltail

Table 4: Plant Species of Special Concern in Union County

Scientific Name	Common Name
Acorus calamus	Sweet Flag
Aplectrum hyemale	Puttyroot
Asarum canadense	Canada Wild-ginger
Asplenium rhizophyllum	Walking-fern Spleenwort
Carex meadii	Mead's Sedge
Cladrastis kentukea	Yellowwood
Euonymus atropurpureus	Burning Bush
Frasera caroliniensis	American Colombo
Galearis spectabilis	Showy Orchis
Hexalectris spicata	Crested Coralroot
Hybanthus concolor	Green Violet
Juglans cinerea	White Walnut
Osmorhiza longistylis	Smoother Sweet-cicely
Pachysandra procumbens	Allegheny-spurge
Panax quinquefolius	American Ginseng
Polemonium reptans	Jacob's Ladder
Symphyotrichum ericoides	White Heath Aster
Triosteum angustifolium	Narrow-leaf Fever Root

Table 5: Plant Species of Special Concern Tippah County

Scientific Name	Common Name
Adiantum capillus-veneris	Southern Maidenhair-fern
Agalinis oligophylla	Ridge-stem False-foxglove
Asarum canadense	Canada Wild-ginger
Asplenium rhizophyllum	Walking-fern Spleenwort
Carex picta	Boott's Sedge
Chelone glabra	White Turtlehead
Cypripedium parviflorum var. pubescens	Yellow Lady's-slipper
Deparia acrostichoides	Silvery Spleenwort
Diplazium pycnocarpon	Glade Fern
Galearis spectabilis	Showy Orchis
Goodyera pubescens	Downy Rattlesnake-plantain
Hybanthus concolor	Green Violet
Isotria verticillata	Large Whorled Pogonia
Juglans cinerea	Butternut
Ligusticum canadense	Nondo Lovage

Water Body Classifications and Designated Uses

Surface waters in Mississippi are used for a number of purposes. Waters are used for drinking and food processing, shellfishing, recreation, fishing, and aquatic life support. Water bodies are classified and assigned various use classifications by MDEQ in the state's *Regulations for Water Quality Criterial for Intrastate, Interstate, and Coastal Waters (11 Miss. Admin. Code Pt. 6, Ch. 2)* (MDEQ, 2016) based on the use of the waterbody identified by the public and other entities. The use classifications and associated USEPA designated uses for water quality assessment purposes recognized by the State of Mississippi are as follows:

Use Classification	USEPA Associated Designated Use
Public Water Supply	Drinking Water Supply
Recreation	Contact Recreation
Fish and Wildlife	Aquatic Life Use, Fish Consumption, Secondary Contact Recreation
Shellfish Harvesting	Shellfish Consumption

The water use classification for Jasper Creek and other water bodies within this watershed is Fish and Wildlife. As described above, the associated designated uses with this classification are aquatic life support, fish consumption and secondary contact recreation.

Water Quality Status

MDEQ has conducted statewide biological monitoring using benthic macroinvertebrates as the indicator to develop a regionally-calibrated *Index of Biological Integrity (IBI)* for wadeable streams. This index, known as the *Mississippi Benthic Index of Stream Quality (M-BISQ*), was used in the biological assessment of the State's wadeable streams and rivers including Jasper Creek. Based on the *M-BISQ* scores, this water body was determined to be impaired. Therefore, Jasper Creek (MS900511) was placed on the *Mississippi 2006 Section 303(d) List of Impaired Water Bodies (MDEQ, 2006)* for Biological Impairment. Biological community data were collected at two sampling locations along Jasper Creek (Figure 3) and samples were collected in 2003, 2013 and 2015. Biological community data were collected at both the upstream and downstream sampling locations in 2003 and scored using M-BISQ protocols. These scores were 47.17 and 40.05 points below the attainment threshold for streams in the bioregion. In 2013, the downstream location was resampled and the score was 32.2 points below the attainment threshold. In 2015, the upstream monitoring location was resampled, and while showing some improvement, the score was still 31.1 points below the attainment threshold. All data described here represent the status of the stream prior to implementation of the conservation practices identified in this watershed plan. Monitoring will be scheduled 2-3 years post implementation to give the stream time to recover and allow the conservation practices to take effect.

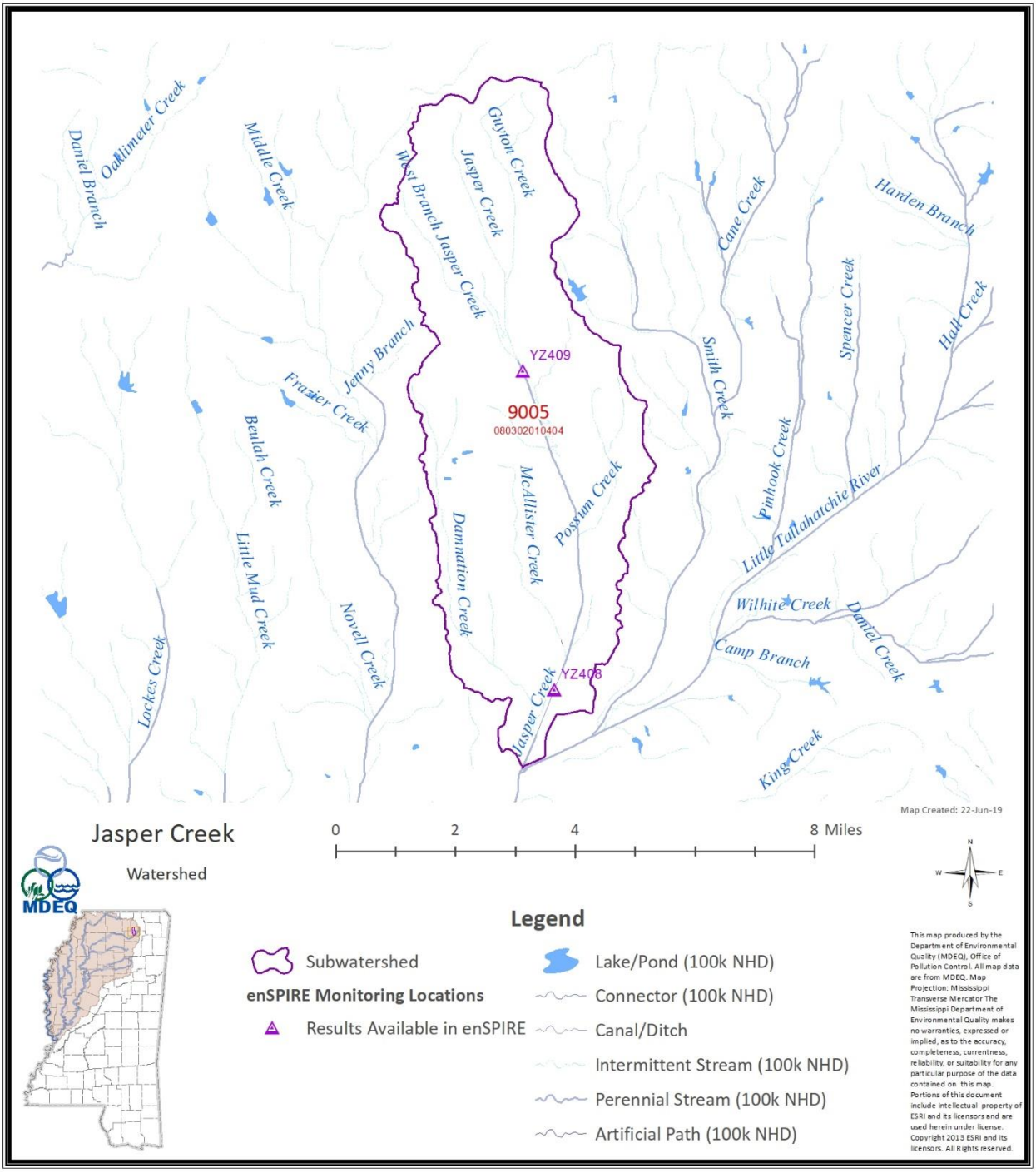


Figure 3: Jasper Creek Watershed Monitoring Locations

Total Maximum Daily Load (TMDL)

When water bodies are assessed as not attaining their designated use(s), those waters are compiled into a list as required by Section 303(d) of the Clean Water Act. This list represents waters that are deemed impaired for one or more designated use(s) and as a result, a total

maximum daily load (TMDL) for the pollutant determined to be causing the impairment must be developed pursuant to 40 CFR part 130. The TMDL is representative of a stream budget where pollutant specific allowable loads are developed to ensure the water body can meet appropriate water quality criteria and designated uses.

Jasper Creek (MS900511) was first listed on MS's Section 303(d) List of Impaired Water Bodies in 2006 for biological impairment. Figure 4 provides a map of the listed segment. Using biological community metrics, habitat data, water quality, and measures of stream geomorphology, a stressor identification analysis was completed for the Jasper Creek watershed to determine the most likely cause(s) of the impairment. This analysis identified sediment as the primary probable stressor of the water body and a TMDL was developed in 2019. The *Regulations for Water Quality Criterial for Intrastate, Interstate, and Coastal Waters (11 Miss. Admin. Code Pt. 6, Ch. 2)* (MDEQ, 2016) does not include a numeric water quality standard for aquatic life protection due to sediment. As stated in the TMDL, the narrative standard for the protection of aquatic life is sufficient for justification of TMDL development, but does not provide a quantifiable TMDL target. The target is based on reference sediment yields developed by the Channel and Watershed Processes Research Unit (CWPRU) at the USDA, Agricultural Research Service, National Sedimentation Laboratory (NSL).

The CWPRU developed reference sediment yields, or targets, for each level III ecoregion within Mississippi. These yields were derived from the empirical analysis of historical flow and suspended sediment concentrations for stable streams in each level III ecoregion. The methods used to develop the level III reference yields are described in detail in the reports titled "*Reference" and "Impacted" Rates of Suspended-Sediment Transport for Use in Developing Clean Sediment TMDLs: Mississippi and the Southeastern United States* (Simon, et al., 2002b) and *Actual and Reference Sediment Yields for the James Creek Watershed – Mississippi* (Simon, et al., 2002a).

For the Jasper Creek watershed, the estimated allowable range of sediment loads for stable streams is 0.0004 to 0.0019 tons per acre per day at effective discharge. Also based on this analysis, a range of unstable values was assigned to the listed waterbodies within HUC 080302010404 based on the level III ecoregion unstable stream values. The unstable range is representative of the existing loads that would be expected for water bodies within HUC 080302010404. The unstable range for water bodies within HUC 080302010404 is 0.002 to 0.054 tons per acre per day at the effective discharge. The ecoregion approach was used to estimate existing load ranges for unstable streams and this range was then used to estimate the existing load for the Jasper Creek Watershed to be 39.3-1,035 tons per day. The load allocation developed by the TMDL is an estimation of the acceptable contribution of all nonpoint sources in the watershed and includes contributions from the channel and surface runoff in the watershed. The load allocation developed for the Jasper Creek Watershed is 14.4 tons per day. The estimated existing loading is higher than the target loading; therefore, a reduction in sediment loading of 63.4%-98.6% is recommended for HUC 080302010404. The TMDL recommends the implementation of streambank and riparian zone buffer best management practices along with any other conservation practices to limit sediment from entering streams in the watershed.

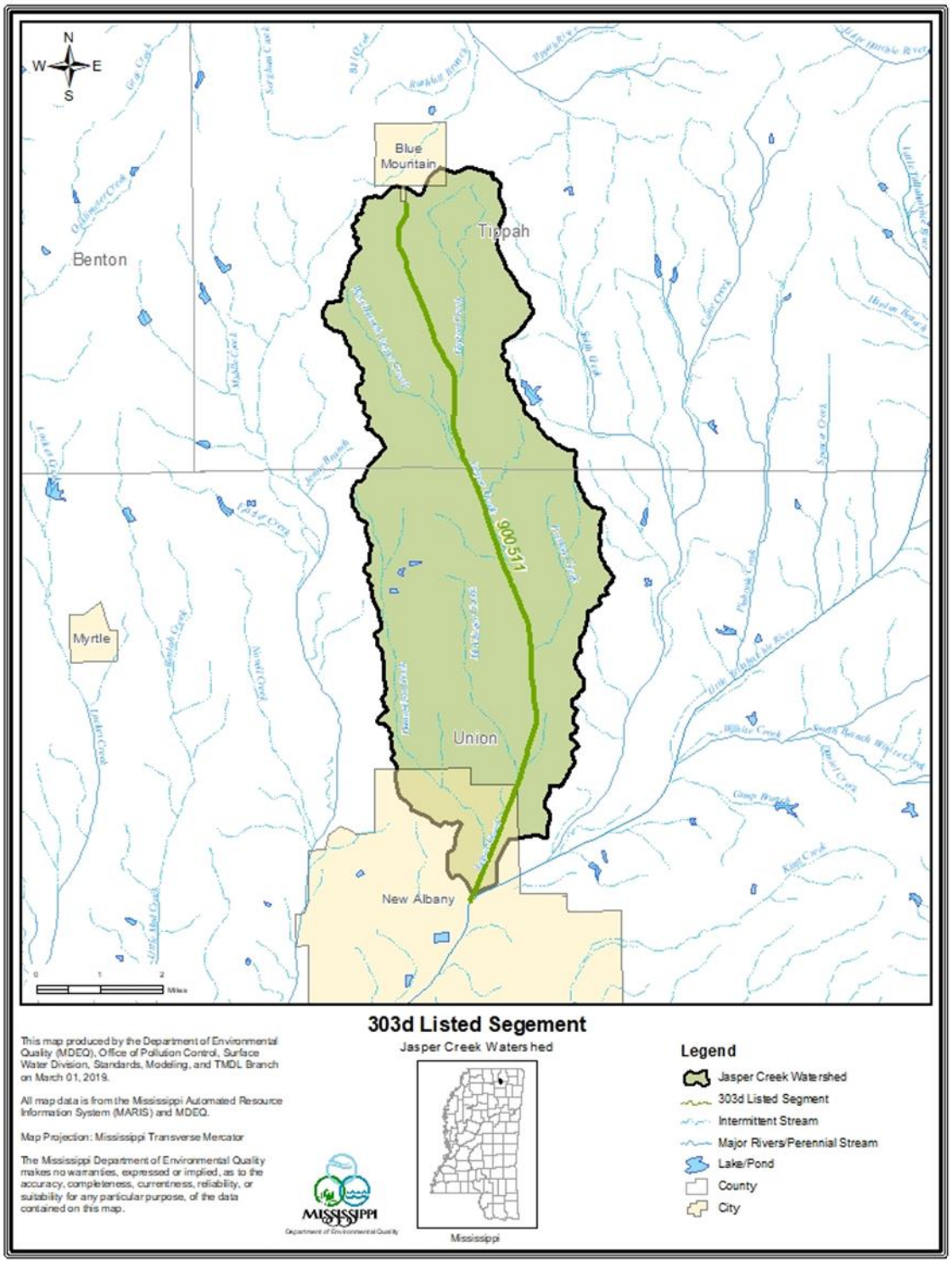


Figure 4: Map of 303(d) Listed Segment for Jasper Creek (MS900511)

WATERSHED MANAGEMENT ACTIONS

Nutrient and Sediment Best Management Practices

Stakeholder Interests

The major concerns of the stakeholders include nutrient and sediment loadings to water bodies in the Jasper Creek watershed.

Roles and Responsibilities

There are several different groups with responsibilities in this watershed. NRCS staff has the responsibility of identifying landowners, providing technical assistance, designing the BMPs and making payments for practices installed under EQIP. The landowners have the responsibility of implementing BMPs in the project area. The Jasper Creek Watershed Implementation Team has the role of helping gather the information needed to write the Watershed Based Plan. The MSWCC has the responsibility of compiling all the information, writing and updating the plan for the watershed and providing oversight for the Section 319 project. The Union and Tippah County Soil and Water Conservation Districts will have and responsibility of helping in the identification of potential participants for the project, coordinating all the paperwork for payments of practices, and assisting in helping plan and conduct the field days for the project.

Goals and Objectives

The goal of this watershed implementation team and resulting watershed based plan is to reduce the nutrient and sediment loading coming from agricultural and other land use activities in an effort to improve water quality in the Jasper Creek Watershed. This approach provides the stakeholders an opportunity to restore Jasper Creek by addressing the sediment and associated nutrient loadings into the stream.

Management Actions

The management actions identified to address nutrient and sediment loadings involve installation of agricultural BMPs, water quality monitoring, public outreach/education and other measures. These BMPs included:

- Streambank and Shoreline Protection,
- Grade Stabilization Structures,
- Critical Area Planting,
- Heavy Use Area Protection,
- Tank/Trough and others.

These BMPs were installed by the participating landowners in the watershed utilizing funds through a Section 319 Water Quality Project and the NRCS Environmental Quality Incentives Program (EQIP) program. Local NRCS staff provided the technical/planning assistance for BMP implementation on both programs. The NRCS also provided funding for the BMP implementation for the EQIP practices. Most of the BMPs that were installed are permanent structures and must be maintained by the landowner for a period of 10-15 years. NRCS employees, as well as Tippah and Union County Soil and Water District employees identified landowners in the watershed that had agricultural land needing treatment and participated in project.

Project Tracking and Assessment of Progress

The Jasper Creek Watershed project began in late 2016. All BMPs that have been installed before the beginning of the project through the NRCS EQIP program are tracked by utilizing the Revised Universal Soil Loss Equation (RUSLE) on all acres affected by the BMPs. This is the same method that was used to track all EQIP practices that were implemented in the project area during the life of the project (2016-2019) and any practices installed with 319 funding. In addition to the calculation of soil savings accomplished using RUSLE, MDEQ used the U.S. Environmental Protection Agency (EPA) Region 5 Model to estimate total phosphorus, total nitrogen, and sediment savings achieved through the implementation of the practices funded using Section 319 dollars.

The Region 5 Model was originally developed in 1999 by the Michigan Department of Environmental Quality and provides a gross estimate of sediment and nutrient load reductions from the implementation of conservation practices. In 2018, the model was updated to estimate flow captured by infiltration practices and enhanced to include the functionality of estimating baseline load from annual rainfall and event mean concentration in surface runoff. This model is a simplistic model available for download from USEPA's website that is easy to use while allowing the end user to provide some estimate of water quality benefit from conservation practice implementation.

Desired Results/Benefits

The desired results of this project were to improve water quality in the watershed by reducing sediment and nutrient loading to the streams, engage the landowners and encourage conservation practice implementation, and educate stakeholders on the benefits of BMPs and how nonpoint source pollution affects the waters in the watershed and the rest of the state.

As part of this project, the BMPs that were installed using Section 319 grant funding were tracked individually and entered in the Region 5 Model to estimate nutrient and sediment reductions achieved from these practices. Through this project, approximately 1,129 tons of sediment were kept from entering the streams and total nitrogen and total phosphorus were reduced by 1,255 lbs/yr and 3,053 lbs/yr respectively. Because MDEQ did not have access to detailed individual practice data implemented using NRCS EQUIP funds, the reduction estimates could not be calculated for those practices.

Budget

Using information from the USDA Protracts database, aggregated data was queried and provided for use in this report for the Jasper Creek Watershed. Under the EQIP program funded through NRCS, there has been over $96,000 spent on conservation practices in Union and Tippah Counties from 2008-2018. The table below provides a list of the practices funded through EQIP during the Jasper Creek Watershed Implementation Project (2016-2018).

Table 6: Conservation Practices Implemented through EQIP (2016-2018)

NRCS Practice	Number/Amt.	$ Spent
Mulching	1.9 ac	$907.35
Land Clearing	1 ac	$1,935.00
Grade Stabilization Structure	5 no	$22,248.70
Critical Area Planting	1.9 ac	$801.12
Herbaceous Weed Control	32.8 ac	$803.82
Heavy Use Protection Area	2 no	$1,431.25
Watering Facility	2 no	$2,145.01
Livestock Pipeline	950 ft	$2,104.60
High Tunnel System	2160 sq ft	$4,829.76
Cover Crop	0.7 ac	$87.40
Micro-irrigation System	0.7 ac	$174.72
Total		**$37,468.73**

As part of this plan, the MSWCC along the MDEQ allocated money from the FY2015 Section 319(h) grant to fund the implementation of on the ground conservation practices along with education and outreach activities for stakeholders in the watershed to improve water quality. The table below provides a list of the BMPs installed using Section 319 funds as part of this project.

Table 7: Budget for BMPs Implemented Using Section 319 Funds

BMP	Number/Amt.	$ Spent
Streambank and Shoreline Protection	990 feet	$78,555.00
Grade Stabilization Structure	42 ea	$398,624.06
Stream Crossing	1 ea	$10,500.00
Heavy Use Protection Area	1 ea	$4,260.00
Tank and Trough	4 ea	$9,225.86
Fencing	2,802 feet	$6,990.42
Diversion	2,040 feet	$16,066.29
Sub Surface Drain	1ea	$3,951.23
Total		**$528.172.86**

In addition to the implementation of on the ground conservation practices in the watershed, funding was also spent to implement the education and outreach plan describe in the next section. The funding spent for education and outreach activities is summarized below:

Table 8: Budget for Education and Outreach Activities

Activity	Cost
Signage	$ 2,000.00
Field Days	$ 1,590.26
Educational Literature	$ 1,000.00
Mobile Classroom	$ 1,300.00
Presentations	$ 150.00
Adopt-A-Stream	$ 1,000.00
Total Estimated Cost	**$7,040.26**

Staff from the MSWCC and the Tippah and Union County Soil and Water District offices also provided technical assistance during the implementation of the BMPs in the watershed and in the development and revision of the Jasper Creek Watershed Based Plan. The total budget, including the estimates from the conservation practices implemented by NRCS through the EQIP program are provided below.

Table 9: Total Budget for Jasper Creek Watershed Based Plan and Implementation

Activity	Cost
Section 319 Grant Funded BMPs	$528,172.86
NRCS EQIP Funded BMPs	$37,468.73
Education and Outreach	$7,040.26
Technical Assistance	$24,899.93
Total	**$597,581.78**

During the implementation of this project, partners provided matching contributions in the amount of $534,837.55 bringing the total project funding to $1,132,419.30.

EDUCATION AND OUTREACH ACTIVITIES

The overall objective of community education in the Jasper Creek Watershed is to develop an atmosphere that promotes sustained, long-term protection and improvement of the aquatic resources in the watershed. Specific goals of education efforts in the watershed include the following:

- Increase public awareness of the value of clean water;
- Increase public awareness of agricultural runoff and encourage behaviors that will help reduce levels of nutrients and sediment in the watershed, watershed characterization and stewardship opportunities;

- Increase public awareness of how BMP's can help improve water quality and habitat restoration; and,
- Increase public awareness of the long term environmental and economic advantages of protecting and improving water quality and habitat in the Jasper Creek Watershed.

Table 10 outlines objectives, indicators, and implementation schedule identified in order to meet the education and outreach goals defined above.

Table 10: Education and Outreach Objectives

Education Objective	Indicator	Partners	Schedule	Outputs
Watershed Signage: Signs identifying the installed BMP's will be erected throughout the watershed with permission of the landowner's.	A field day will be held to show other landowners and the interested public the BMP's installed. Also, the associated benefits from BMP installation will be demonstrated to the participants. Participants will be counted at this field day. Traffic through the watershed cannot be documented, but we will attempt to install signage in heavily trafficked areas, in order to bring attention to the project and promote public interest.	MSWCC, MDEQ, Union County Soil and Water Conservation District, Tippah County Soil and Water Conservation District, NRCS, and USEPA	The BMP signs will be erected as practices are completed and/or requested by the landowner throughout the life of the project.	20 signs were implemented at locations were BMPs were installed in the watershed
Field Days: A field day will be held to showcase some of the BMP's installed under the National Water Quality Initiative. This will allow the landowners and the interested public to view some of the practices that are being installed to benefit water quality in the watershed.	Attendance at this field day will be documented and reported.	MSWCC, MDEQ, Union County Soil and Water Conservation District, Tippah County Soil and Water Conservation District, NRCS, and USEPA	Field day was held April 18, 2019.	200 flyers were mailed out the stakeholders in the watershed and approximately 20 people attended the field day

Education Objective	Indicator	Partners	Schedule	Outputs
Educational Literature: Brochures and a fact sheet have been developed about this project. Brochures will be developed to inform landowners/operators about water quality and ways they can protect and improve the water quality in their watershed. The fact sheet contains information about the watershed and the numbers and types of BMP's installed.	Brochures and fact sheets will be distributed. These brochures and fact sheets will be handed out at the field days and outreach meetings and will also be available at the district offices.	MSWCC, MDEQ, Union County Soil and Water Conservation District, Tippah County Soil and Water Conservation District, NRCS, and USEPA	Available at District Offices and provided to public during the on farm demonstration field day.	1,000 fact sheets were printed and provided at the on farm demonstration field day sponsored in the watershed.
Environmental Education Mobile Classroom: A mobile, interactive classroom activity targeted for K through 5th grade students providing information about NPS pollution in watersheds and what people can do to improve water quality. Activities presented in the program align with the standards adopted by the Mississippi Department of Education.	The number of participants will be documented and submitted	MSWCC, MDEQ, Bayou Town Productions, USEPA	Mobile Classroom was presented at a Conservation Field Day event hosted by Union County Soil and Water Conservation District and the Union County Garden Club on May 17-18, 2017	During the Conservation Field day, 25 Adults and 316 students attended the Mobile Classroom Education outreach event.

Education Objective	Indicator	Partners	Schedule	Outputs
Presentations: Presentations related to water quality will be made to civic organizations. These presentations will inform individuals about ways they can improve water quality and reduce non-point source pollution.	The number of people in attendance will be documented.	MSWCC, MDEQ, Union County Soil and Water Conservation District, and Tippah County Soil and Water Conservation District	These presentations will be made before month 32 of this program. There were presentations made on June21, 2018 in Pittsboro and May 30, 2019 in Oxford.	There were approximately 75 people in Pittsboro and 110 in Oxford that attended these presentations.
Adopt-A-Stream: Adopt-a-stream is a program that promotes environmental stewardship through training workshops, outdoor field activities, and by introducing participants to watershed action projects. One and two day workshops inform participants about watershed topics such as stream health, stream ecology, aquatic life, water chemistry.	The number of participants will be documented	MDEQ, The Wildlife Federation, and USEPA	There was an Adopt-a-stream program conducted April 16, 2019 in Ripley.	There were approximately 325 students and teachers present at this training.

Water Quality Monitoring

In lieu of numeric criteria for sediment and nutrients, the monitoring will be conducted to collect data on parameters that are considered surrogates for sediment (Total Suspended Solids, Total Suspended Sediment, turbidity) and nutrients along with conventional in-situ parameters generally measured to determine aquatic health (e.g. Dissolved Oxygen, pH, Temperature, Conductivity, Dissolved Solids) will also be obtained. The following thresholds will be used to measure compliance applicable with water quality criteria and/or target thresholds:

Table 11: Water Quality Thresholds for Jasper Creek Watershed

Parameter	**Threshold**
Dissolved Oxygen	Daily Average of 5.0 mg/L; Instantaneous threshold of 4.0 mg/L
Dissolved Oxygen % Sat	≥ 70% - ≤ 125%
pH	6.0 – 9.0
Temperature	Not to exceed 90°F
Specific Conductance	Less than 1000 micromhos/cm
Dissolved Solids	Monthly average less than 750 mg/L; instantaneous threshold less than 1500 mg/L
Chemical Oxygen Demand	35 mg/L
Total Suspended Solids	65 mg/L
Turbidity	75 NTU
M-BISQ East Bioregion	71.6 Calibration 3 (Applicable to waters outside the Mississippi Alluvial Plain)

In addition to chemical data, biological community data and in-stream habitat surveys were collected at two monitoring locations on Jasper Creek to determine attainment of the Aquatic Life Designated Use. These data are extremely helpful in identifying positive trends in water quality and should provide information to help determine if the implementation activities are resulting in water quality improvements. As the implementation activities continued through most of 2019, the stream will need sufficient time to recover before post BMP monitoring is scheduled. Along with overall MBISQ scores, the in-stream habitat surveys will also be used to determine change over time.

Once post BMP biological community data are collected, those data will be analyzed to determine if it indicates improvements to water quality in Jasper Creek. In the event data indicate little or no positive change, a Stressor Analysis will be conducted to determine if any new or additional stressors are preventing improvements to water quality. If any new stressors are identified, the Watershed Implementation Team will identify future actions/activities to address those stressors.

PLAN REVISION

Plan Revision Procedure

After evaluation, the Jasper Creek WIT will prepare a revised watershed implementation plan by incorporating the changes requested by the reviewers and reconciling any conflicting comments or requests for change.

If the evaluation criteria are all being met for Jasper Creek watershed, the WBP will be revised to address a different restoration issue or issues, in order to protect the water quality of the watershed. If the evaluation criteria for the watershed are not being met, the approach for restoring Jasper Creek watershed will be revised based on the knowledge that has been gained through BMP installation and monitoring activities performed.

The draft WBP will be submitted to the WIT, and all others who submitted comments. Within two weeks of receiving the draft WBP, the WIT will notify their stakeholders of the availability of the revised WBP for stakeholder review. One month will be allowed for review of the draft. Comments will be due at the end of this review period.

Within a month after the comments on the draft WBP are received, an updated implementation plan will be submitted to the WIT for review and approval. After the updated WBP has been approved, the WIT will notify their stakeholders of the completion and availability of the final updated plan for use as a guide to watershed restoration and protection activities.

Results of WBP Plan Revision

The WBP has been updated to include updated milestones for the education/outreach activities that have taken place in the watershed during the Jasper Creek Watershed Implementation Project funded through the FY 2015 Section 319(h) Grant funds along with a listing of all conservation practices that have been implemented using those funds 2016-2019. In addition, using data provided from the USDA Protracts data system, a list of conservation practices implemented in the watershed 2016-2018 through the NRCS EQIP program have been provided.

Using EPA's Region 5 Model, estimates of sediment, total phosphorus, and total nitrogen reductions were made for those practices implemented using Section 319 grant funds.

This section will be further revised based on the results from the WIT feedback once the updated WBP has been reviewed and comments have been received.

EVALUATION

Plan Evaluation Procedure

The success of the implementation of the Jasper Creek WBP will be evaluated and consequently, the plan will be revised as needed. The evaluation of this WBP will be conducted by the Jasper Creek WIT or its designees by comparing results to the targets to help determine:

- If the plan goals have been achieved;
- If the plan implementation restores the water quality of Jasper Creek; and
- If it addresses the priority issues as identified by the WIT.

The WIT will measure the resources (financial, technical, and time) used; (ii) the implementation activities (e.g., BMPs installation) conducted; and (iii) the environmental benefits (e.g., water quality improvement) achieved.

The evaluation information will be provided to all interested stakeholders to help facilitate necessary revision of the WBP. The WIT will develop a detailed schedule for review and revision of the Jasper Creek WBP to determine the effectiveness of implementing the management measures, and water quality improvement.

Findings from Plan Evaluation

This revisions/updates were provided to the WIT. Based on the information provided, the WIT agreed the project, as designed and implemented, facilitated the placement of sediment and nutrient conservation practices within the watershed. As these BMPs continue to remove sediment and nutrients from receiving streams in the Jasper Creek Watershed, improvements to water quality should be achieved. The implementation of these BMPs achieved the goals established by the WIT. Based on this evaluation, the WIT has reviewed the WBP for Jasper Creek Watershed and determined it to be final at this time until additional water quality data are available for further evaluation.

RESOURCES

Natural Heritage Inventory: Search Animal Database." *Mississippi Museum of Natural Science.* <http://www.mdwfp.com/museum/html/Research/query_animals.asp>

Natural Heritage Inventory: Search Plant Database." *Mississippi Museum of Natural Science.* <http://www.mdwfp.com/museum/html/Research/query_plants.asp

MDEQ. 2003a. *Development and Application of the Mississippi Benthic Index of Stream Quality (M-BISQ)*. Prepared by Tetra Tech, Inc., Owings Mills, MD, for the Mississippi Department of Environmental Quality, Office of Pollution Control, Jackson, MS.

MDEQ. 2006. *Mississippi List of Waterbodies, Pursuant to Section 303(d) of the Clean Water Act*. Office of Pollution Control. Jackson, MS

MDEQ. 2014. *State of Mississippi Water Quality Assessment 2014 Section 305(b) Report.* Office Of Pollution Control. Jackson, MS.

MDEQ. 2016. *Regulations for Water Quality Criterial for Intrastate, Interstate, and Coastal Waters (11 Miss. Code Ann. Admin. Code Pt. 6, Ch. 2)*. Web 2019. Office of Pollution Control. Jackson, MS.

MDEQ. 2019. *Total Maximum Daily Load Yazoo River Basin Jasper Creek HUC 080302010404 for Impairment due to Sediment.* Office of Pollution Control. Jackson, MS.

Simon, A., Bingner, R.L., Langendoen, E.L., and Alonso, C.V. 2002a. *Actual and Reference Sediment Yields for the James Creek Watershed--Mississippi*. Research Report No. 31, USDA-ARS National Sedimentation Laboratory, xvi+185 pp.

Simon, Andrew, Roger A. Kuhnle, and Wendy Dickerson. 2002b. “Reference” and “Impacted” Rates of Suspended-Sediment Transport for Use in Developing Clean Sediment TMDLs: Mississippi and the Southeastern United States. *National Sedimentation Laboratory Report 25*. Oxford, MS. United States Department of Agriculture. Agricultural Research Service. National Sedimentation Laboratory. Channel and Watershed Processes Research Unit.

USDA. SCS. 1979. Soil Survey of Union County, Mississippi.

APPENDIX A

Milestones for Section 319 Watershed Implementation Project

Milestones for the portion of the WBP that was funded through Mississippi's FY 2015 Section 319(h) Grant are provided below. These milestones and the work outlined therein were implemented through a sub-grant agreement between the Mississippi Department of Environmental Quality and the Mississippi Soil and Water Conservation Commission.

Milestones:

1. Sign grant contract with MS Department of Environmental Quality. (Month 0)

2. Determine priority areas that are contributing significant loads in the watershed. (Month 1)

3. Issue policies and procedures for implementing the project to the SWCD office. (Month 1)

4. Meet with the board of SWCD commissioners to get their understanding of their responsibilities and participation. (Month 2)

5. Provide training to district staff. (Month 2-3)

6. Assist in establishing an evaluation system in conjunction with the MS Department of Environmental Quality to indicate the benefits of the project. (Month 2-3)

7. Conduct a landowner meeting to inform potential participants about the project. (Month 3)

8. Secure commitments from several landowners and operators who are willing to participate in the project. (Month 3-4)

9. Assist participants in developing a conservation plan and applying best management practices (Month 4-12)

10. Establish at least demonstration farm (Month 4-12)

11. Document pre-existing site conditions. (Month 2-12) (Before and after photo documentation will be conducted).

12. Accelerate conservation planning and application assistance. Special effort will be made to complete conservation plans during this time frame. (Month 13-24)

13. Conduct at least 1 informational field day/tour to inform the public about the project. (Month 13-24)

14. Establish at least 1 demonstration farm. (Month 13-24)

15. As requested, assist DEQ with evaluations. (Month 0-36)

16. Collect GPS coordinates and other data required by MDEQ on all BMPs installed in the project. (Month 0-36)

17. Assemble data on the amount of soil saved. (Month 0-36)

18. Erect project roadside signs which designate where water quality practices are in progress or have been completed. (Month 4-36)

19. Provide continued conservation planning and application assistance to participants. (Month 25-36)

20. Review the status of applying best management practices to reach the objectives of the project. (Month 25)

21. Based upon the needs and finding of milestone 18, assistance in planning and/or application will be redirected and/or accelerated. (Month 25-36)

22. Publish at least 4 articles about the project. (Month 0-36)

23. Publicity of the project will be increased; at least 1 field day/tour will be conducted and at least 1,000 fact sheets will be developed and distributed. (Month 25-36)

24. Bi-annual reports will be made to MSDEQ. (Month 0-36)

25. Make Final report to MSDEQ. (Month 36)

APPENDIX B

Checklist of Watershed Implementation Elements

Required 9 Elements for §319 Grant	Location in Watershed Based Plan
1. Causes and Sources of Pollution	Total Maximum Daily Load (TMDL), page 12
2. Load Reductions Needed	Total Maximum Daily Load (TMDL), pages 12-14
3. Management Measures to Achieve Goals	Management Actions pg. 15; Table 6 pg. 17; Table 7 pg. 17; Table 10 pg. 20
4. Technical and Financial Support Needed	Table 9: Total Budget for Jasper Creek Watershed Based Plan and Implementation, page 18
5. Education and Outreach	Education and Outreach Activities, page 18
6. Implementation Schedule	Milestones for Section 319 Watershed Implementation Project, page 27
7. Milestones	Milestones for Section 319 Watershed Implementation Project, page 27
8. Criteria to Measure Progress	Project Tracking and Assessment of Progress, page 16; Desired Results/Benefits, page 16; Water Quality Monitoring, page 23
9. Monitoring	Water Quality Monitoring, page 23

APPENDIX C

Project Summary Scorecard

Jasper Creek Watershed Nutrient and Sediment Load Reductions

USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Mississippi Soil & Water Conservation Commission
EARTH GREEN - WATER CLEAN

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Sediment Saved: 5,076,460 lbs.

Enough to fill 210 dump trucks (14 CuYd bed)!

x177

Phosphorus Saved: 5,780 lbs.

Enough to fill 47 wheelbarrows (2 ft^3)!

x39

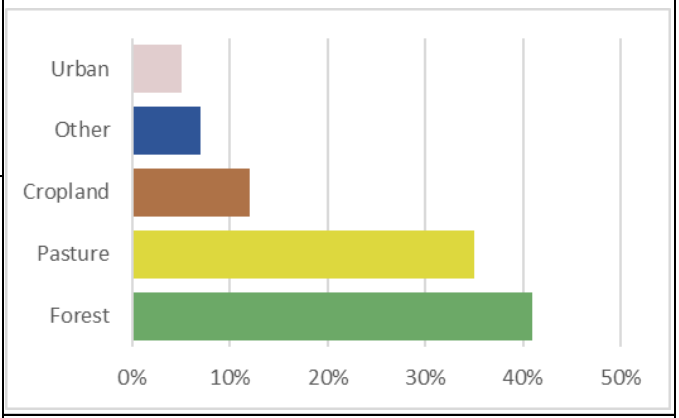
Nitrogen Saved: 2,613 lbs.

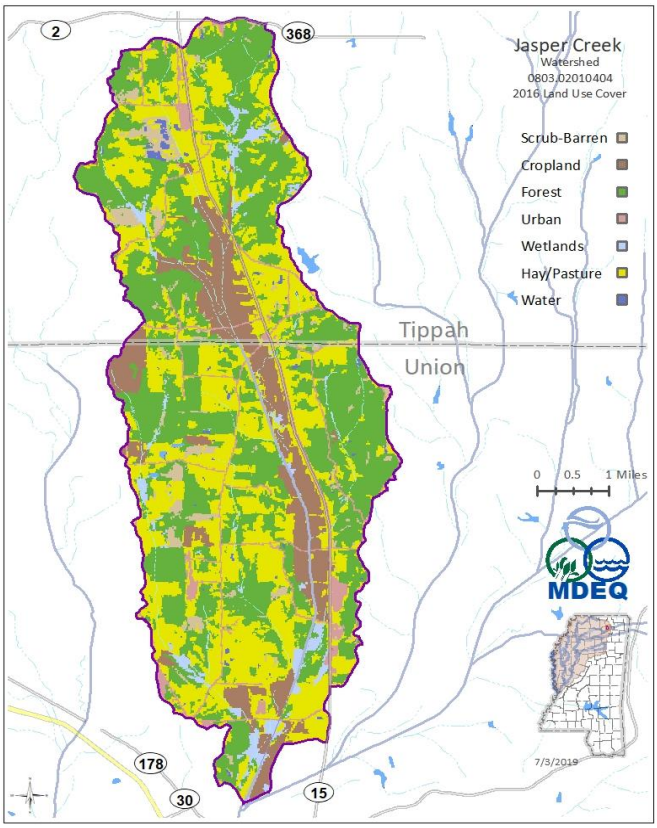
Enough to fill 21 wheelbarrows (2 ft^3)!

x17

Practices do not include the many unassisted practices designed and installed by private landowners.
Nutrient estimates only consider sediment bound N and P, not dissolved components.
Load reductions are calculated using the EPA's Region 5 Load Reduction Model.

Landuse Across Jasper Creek Watershed
2016 National Land Cover Dataset





Time Period	Funding Source	Sediment Reduction (lbs)	Phosphorus Reduction (lbs)	Nitrogen Reduction (lbs)
2016 - 2018	NRCS EQIP Program	212,000	434	144
2016 - 2019	Section 319(h) Grant	4,864,460	5,346	2,469
Total		**5,076,460**	**5,780**	**2,613**

Project Partners: Mississippi Department of Environmental Quality, U.S. EPA, Mississippi Soil and Water Conservation Commission, Union County and Tippah County Soil and Water Conservation Districts, and the USDA Natural Resource Conservation Service.

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