Ellison Creek Watershed Plan
9 Key Element Plan
HUC 080602020404
MWS 1044
GY 21 Project Area
September 29, 2021

Element a: Identification of Causes and Sources of Impairment

The Ellison Creek Watershed is located just north of Mississippi's capital in Jackson, MS, along the banks of the Big Black River in Yazoo County and covers an area of 10,957 acres. According to the 2019 National Land Cover Database (NLCD), the landuse within this watershed is comprised of approximately 16% cropland, 22% pasture, 55% forestland, and 7% other (water, scrub/barren, wetland and urban) as depicted in Figure 1.

The water-use classification for all water bodies in this watershed, as established by *Regulations for Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ, 2021)*, is Fish and Wildlife*. Waters with this classification are intended for fishing and propagation of fish, aquatic life, and wildlife. Waters that are classified as *Fish and Wildlife* should also be suitable for secondary contact recreation, which is defined as incidental contact with water including wading and occasional swimming.

Ellison Creek (segment MS430E) was included as an "evaluated" assessment in Mississippi's Section 303(d) List in 1998. Assessments designated as "evaluated" were performed using anecdotal data and information from the watershed, but there was no actual monitoring data to support the determine. Based on the evaluated information provided, Ellison Creek was listed for a suite of causes: pesticides, nutrients, siltation, and organic enrichment/low dissolved oxygen. In 2001, MDEQ collected biological community data on Ellison Creek. The biological community data and resulting index of biological integrity score developed from those data indicated the stream was impaired. Using biological community data along with habitat surveys, and physical/chemical data, a stressor identification analysis was performed. The result of this stressor analysis indicated that sedimentation in the watershed was the primary pollutant contributing to the impairment in Ellison Creek. Based on this information, MDEQ included Ellison Creek (MS430E) in the *Total Maximum Daily Load in the Big Black River Basin for Designated Streams in HUC 08060202 for Impairment Due to Sediment* (MDEQ, 2007)that was developed by MDEQ in 2007. This TMDL calls for a 99% reduction in sediment.

The State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters regulation does not include a numeric water quality standard for aquatic life protection due to sediment. 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 for this TMDL is based on reference sediment yields developed by the Channel and Watershed Processes Research Unit (CWPRU) at the National Sedimentation Laboratory (NSL). Ellison Creek is located within level III ecoregions (74) Mississippi Valley Loess Plains and level IV (74b) Loess Plains.

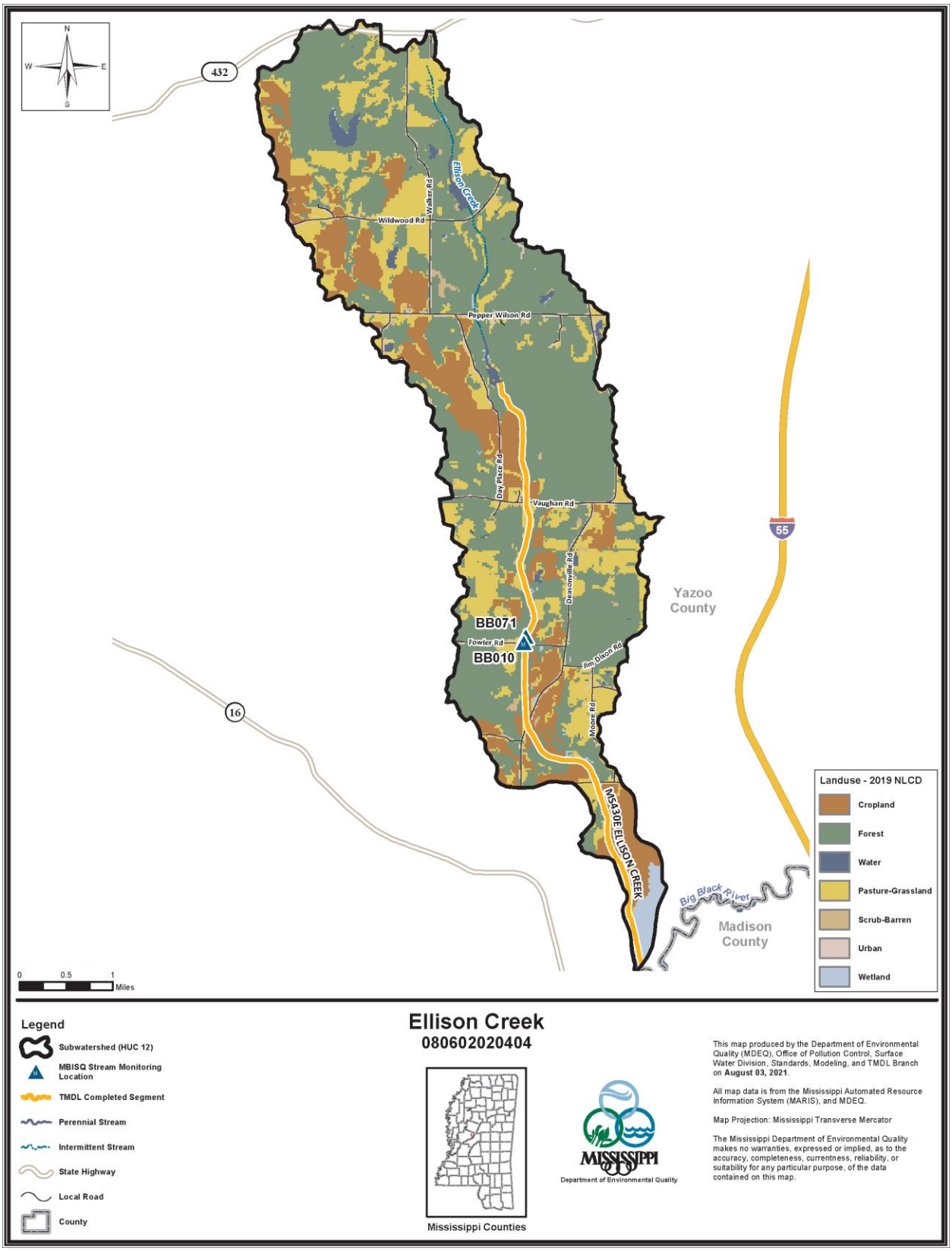

Figure 1: Landuse Distribution in the Ellison Creek Watershed

There are no facilities in the Ellison Creek Watershed with NPDES permits that include limits for Total Suspended Solids (TSS) which is used as an indicator of sediment contributions from permitted activities. Certain contaminants may be associated with sediment such as pesticides and nutrients. These contaminants were not addressed directly within the TMDL. However, these contaminants would also be controlled by the same best management practices (BMPs) that control the sediment from nonpoint sources of pollution. Non-point loading of nutrients and organic material in a water body results from the transport of the pollutants into receiving waters by overland surface runoff, groundwater infiltration, and atmospheric deposition. Unlike nitrogen, phosphorus is primarily transported in surface runoff when it has been sorbed by eroding sediment.

Figure 2 shows the location of the impaired segment along with the monitoring locations in the Ellison Creek Watershed.

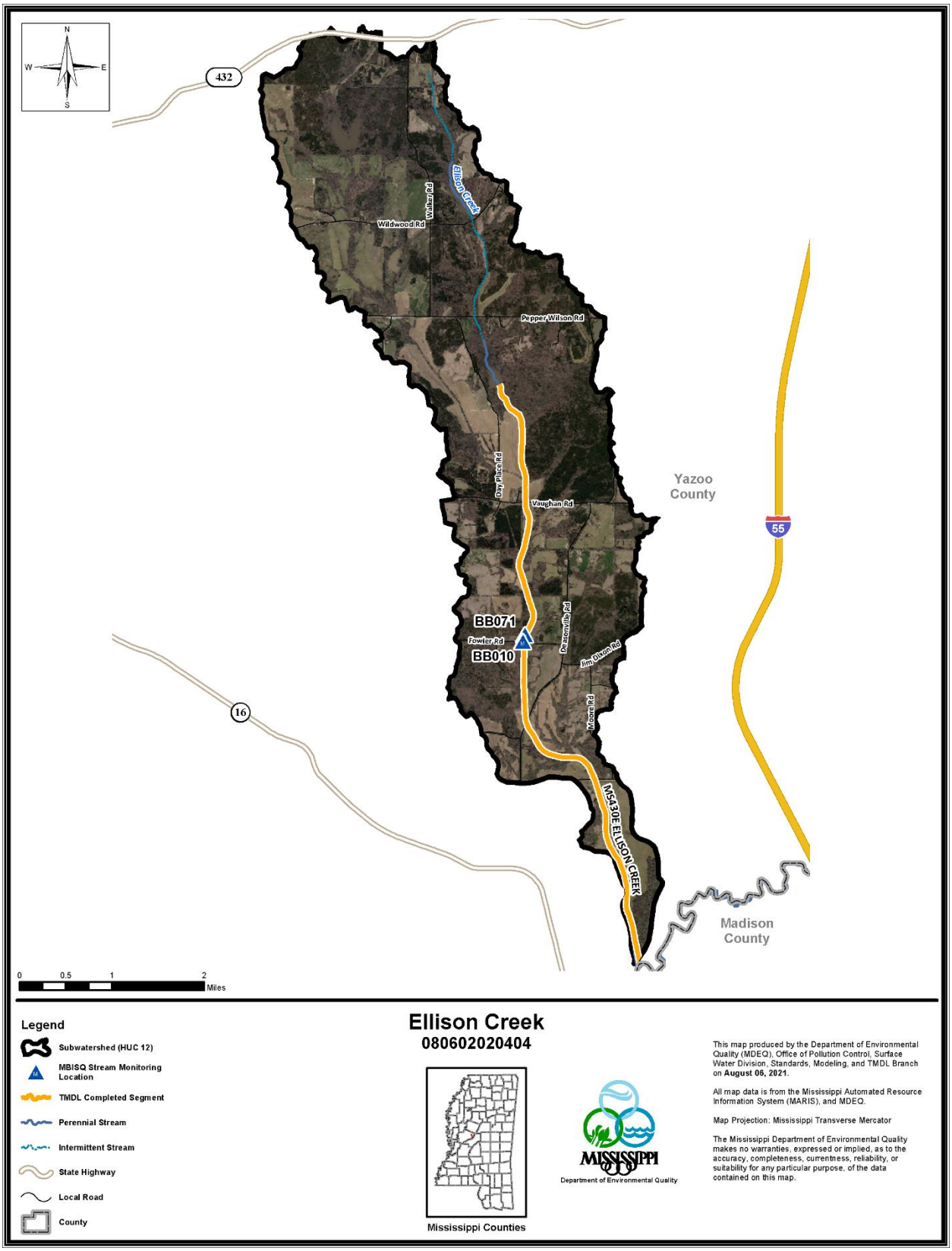

Figure 2: Impaired Segment and Monitoring Sites in the Ellison Creek Watershed

Element b: Expected Load Reduction

The *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ, 2021) regulation does not include a numerical water quality standard for aquatic life protection due to sediment; however, a narrative standard for the protection of aquatic life was interpreted to determine an applicable target for the sediment TMDL in the Ellison Creek Watershed. The narrative standard states waters shall be free from materials attributable to municipal, industrial, agricultural, or other dischargers producing color, odor, taste, total suspended solids, or other conditions in such degree as to create a nuisance, render the waters injurious to public health, recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses. The sediment TMDL for Ellison Creek (MS430E) concluded that sediment yields would need to be reduced by 99% in the watershed. All sediment yield reductions were developed from suspended sediment concentration data measured at stable streams in the same ecoregion(s). The targets were developed to reflect stable stream conditions using reference sediment yields. These reference conditions were established by the USDA's Channel and Watershed Processes Research Unit (CWPRU) at the National Sedimentation Laboratory (NSL).

Nonpoint loading of sediment in a water body results from the transport of material into receiving waters by the processes of mass wasting, head cutting, gullying, and sheet and rill erosion. Sources of sediment include agriculture, silviculture, rangeland, construction sites, roads, urban areas, mass wasting areas, gullies, surface mining, in-channel and instream sources, and historical landuse activities and channel alterations.

The MDEQ will work with agency resource partners to identify and implement BMPs to address sediment concerns in the Ellison Creek Watershed. The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) has a list of approved BMPs to address sedimentation and this list will be used to identify candidate BMPs in the Ellison Creek watershed. While these are for sedimentation, there is an additional benefit in the reduction of nutrients as they attach to sediment particles in run-off. Practices approved by NRCS will be used to identify candidate BMPs in the Ellison Creek watershed.

Element c: Proposed Management Measures

Coordinating partners with MDEQ include the Mississippi Soil and Water Conservation Commission (MSWCC), the Natural Resource Conservation Service (NRCS), and the local Soil and Water Conservation Districts (SWCDs) throughout the state. These SWCDs are typically housed within USDA Service Centers co-located with NRCS offices. These USDA Service Centers handle federal assistance programs offered through the Farm Bill. As part of these services, SWCD staff communicate regularly with the local landowners and operators within the watershed as they work to support sign-ups for Farm Bill initiatives Staff from MSWCC and the SWCD depend upon assistance from their NRCS partners in determining landowner interest in the watershed because they are on the farms and in the fields with the landowners, understand the needs at the local level, and have knowledge of the amount of unfunded applications for federal program assistance which meet Section 319 eligibility requirements. Based on their analysis, installation of the following BMPs would mitigate sediment issues in the Ellison Creek

watershed helping the stream recover: fencing, watering facilities, heavy use areas, stream crossings, ponds, sediment basins, grade stabilization structures, streambank and shoreline protection, stream crossings, forage and biomass planting. Factors considered for determining specific locations for the placement of BMPs included the following attributes based upon best professional judgement of trained NRCS, SWCD and MDEQ Staff:

1. Likely water quality benefit;
2. Willing landowners;
3. Implementation of the recommendations of the TMDL (i.e., "It is recommended that water bodies within [the watershed] be considered a priority for streambank and riparian buffer zone restoration and any sediment reduction BMPs, especially for road crossings, agricultural activities, and construction activities);
4. Ease of showing effectiveness of the BMP(s) through monitoring;
5. Shorter length of time for anticipated results (i.e., within the grant period);

Element d: Technical and Financial Assistance

As part of any Section 319 funded project, MDEQ requires a 40% match in project areas. This match may be in the form of actual dollars or may be provided as "in-kind" to project activities. Partners in this project who may contribute match include MSWCC, Yazoo County Soil and Water Conservation District, NRCS, and/or local landowners and operators. For project implementation, administration, management, and watershed plan revision, as well as hosting and facilitating team meetings, MDEQ plans to work under a memorandum of agreement (MOA) with the MSWCC to implement this project. Project partners provided the funding amounts used to estimate costs for BMP installation. Provided below is summary of estimated costs for potential BMPs and overall project implementation:

Cost Estimate: Full Project Implementation

BMPs*	Size/Amount	Estimated Cost
Grade Stabilization Structure	80 each @ $6,500	$520,000
Sediment Basin	2 each @ $6,250	$12,500
Grassed Waterway	5 each @ $1,408	$7,040
Heavy Use Area Protection	9,000 sq.ft. @ $3.93	$35,370
Stream Crossing	4 each @ $5,000	$20,000
Tank/Trough	17 each @ $6,000	$102,000
Cover Crops	800 ac @ $73	$58,400
Fencing	7,500 ft. @ $4.50	$33,750
Dikes	20,000 ft. @ $1.90	$38,000
Diversions	10,000 ft @ $2.50	$25,000
Pond	5 @ $6,250	$31,250
Terraces	35,000 ft. @ $1.86	$65,100
Forage and Biomass Planting	300 ac. @ $211	$63,300
Streambank and Shoreline Protection	4,000 ft. @ $183.55	$734,200
Technical Assistance**	N/A	$45,000
Education and Outreach**	N/A	$28,000
Monitoring**	N/A	$20,000
Project Management, Implementation, Coordination, Plan Revision**		$135,000
Total Estimated Cost		**$1,973,910**

*Conservation Best Management Practices provide a 40% match at a minimum
** Denotes fields that are estimated upon three incremental funding cycles of the project

Due to the magnitude of BMP needs, this project will need to be funded incrementally using multiply sources of funds. To fully address all suggested conservation needs in the watershed, this plan recommends funding be provided in 3 increments. To maximize education and outreach activities and monitoring efforts, MDEQ plans to leverage with existing programs already allocated for funding where possible.

Below is the estimated budget for the first incremental funding (Phase 1) of this project:

Cost Estimate: Phase 1 Implementation:

BMPs*	**Size/Amount**	**Estimated Cost**
Grade Stabilization Structure	20 each @ $6,500	$130,000
Heavy Use Area Protection	2,700 sq.ft. @ $3.93	$10,611
Tank/Trough	5 each @ $6,000	$30,000
Cover Crops	235 ac @ $73	$17,155
Fencing	2,100 ft. @ $4.50	$9,450
Pond	3 each @ $6,250	$18,750
Technical Assistance	N/A	$15,000
Education and Outreach	N/A	$14,000
Monitoring	N/A	$10,000
Project Management, Implementation, Coordination, Plan Revision		$45,000
Total Estimated Phase 1 Cost		$299,966

*Conservation Best Management Practices provide a 40% match at a minimum.

Element e: Information and Education

The MDEQ, in cooperation with numerous federal, state, and local stakeholders has developed diversified information/education programs, best management practices manuals, literature, books, videos, and public service announcements that address pollutants from the seven (7) major landuse categories of Nonpoint Source Pollution: agriculture, construction, forestry, on-site waste water disposal, surface mining, urban storm water runoff, and hydrologic modification. Audiences from pre-school to adults throughout the state are reached with a variety of mature, well-designed programs each year. These programs, events, manuals and literature can be used in the Ellison Creek Watershed project by tailoring them to address nonpoint sources of sedimentation and nutrients. A positive approach is used to reach the full diversity of people in the community with projects that foster a "sense of place", a "sense of pride in community", and a sense of the native plants, animals, and general ecology of their region, as well as the history of the community and a sense of economics. Stakeholders and coordinators join together to participate in problem-solving, brainstorming, plan development, training workshops, festival event planning, soil and water conservation field days, tree boards, poster, art and writing projects and other activities that promote collaboration and ownership of the watershed, as well as solutions to its problems. The ultimate goal is to bring about behavior changes and the use of "best management practices" that will improve water quality and the overall quality of life in the watershed. Evaluation forms, pre-test/ post-test, surveys, and reporting of the number of people who attend workshops, trainings and events are among the methods used to measure the success of education/information programs. A partial list of MDEQ's programs that could be used in the Ellison Creek watershed are listed below:

- **Water Model Presentations** - Enviroscapes and groundwater aquifer models distributed statewide with training and related interactive lesson plans.
- **Teacher workshops –** train educators in proximity to the watershed about NPS pollution and provide materials and information that can be used in their classrooms.
- **Adopt A Stream -** workshops and training venues for citizens, teachers, and students in the Dry Creek Watershed.
- ***Watershed Harmony Mobile Classroom*** - for ages kindergarten – adults with state and federal public education objectives tailored for 4th and 5th grade students.
- **"Train the trainer" -** workshops and materials for Soil and Water districts, Extension Service, etc.
- **"Waste Pesticide Disposal Event" -** The primary goal of this program is to help Mississippi farmers and property owners minimize the environmental risks associated with the disposal of waste-pesticide products by disposing of products in a safe and efficient manner.

As part of the education outreach efforts, the stakeholder group forming the Ellison Creek Watershed Implementation Team (WIT) will participate in a minimum of 3 face-to-face meetings. The purpose of these meetings is to provide updates on implementation activities, education events and review and modify the watershed plan. In concert with these WIT meetings, and to incentivize stakeholder participation, project funding will be used to purchase food and other refreshments for the WIT along with providing support for renting facilities in which to host those events. In accordance with 41 CFR § 301-74.11, light refreshments, meals, and/or beverages are an allowable expense under CWA Section 319, provided a description of the agenda, purpose, location, costs, etc., are outlined in an approved 319 grant workplan. The purpose of the meetings will be for updating the watershed plan, and hosting field days to showcase the implemented BMPs for the public. At this time the exact number of participants and locations are not known therefore costs have been estimated for the purposes of this plan and will be updated.

Element f: Implementation Schedule

The following schedule describes the approaches and tasks that the grantee shall collaboratively perform with project partners to advance and implement this watershed-based plan. During this effort, resource agency partners will work with the Watershed Implementation Team and MDEQ Project Manager (where applicable), to perform the tasks identified below:

1. Work to develop, execute, and implement a Subgrant Agreement that specifies the roles, tasks, requirements, and milestones for project implementation. (Month 1)

2. Facilitate, in coordination with MDEQ and other partners, meetings, media and social media promotion of the project, and coordinate activities to fully implement this plan. (Months 1-36)

3. Work with the Yazoo County SWCD, MSWCC, NRCS, and MDEQ to inform landowners and operators within the watershed about the project and work to secure

commitments from priority area landowners and operators who are willing to participate in the project. (Months 1-6)

4. Work with the local SWCD, MSWCC, NRCS, and MDEQ to determine through GIS applications and intensive site surveys the priority areas within the sub-watershed that are contributing significant pollutant loads. All BMPs shall be installed in accordance with the guidelines developed in the latest edition of the NRCS Technical Field Manual, or other approved guidelines. (Months 1-36)

5. Facilitate, in cooperation with MDEQ and other monitoring partners, the completion and implementation of an effective and efficient plan to monitor baseline water quality conditions in the watershed and track changes in water quality over time resulting from the BMPs implemented through this project. (Plan Completion: Months 1-2); Implementation: Months 3-36)

6. Submit blank copies of standard maintenance agreements to MDEQ. (Months 13-36)

7. Conduct inspections of BMPs during construction (Months 3-36)

8. Coordinate with and support the local SWCD, MSWCC and NRCS in the collection of relevant GPS coordinates of all installed BMPs and incorporate this information into a GIS format. All geospatial data shall be collected in a manner consistent with the Federal Geographic Data committee-endorsed standards. (Months 3-36)

9. Collect adequate photo documentation before, during, and after installation of the approved BMPs. (Months 3-36)

10. Report measured, or estimated, nonpoint source pollutant load reduction, acreage affected, pre-and post- site conditions, and GIS data. (1-36)

Element g: Milestones and Outcomes

Milestone	**Outcome**	**Probable Completion Date**
Coordinate with the MDEQ, NRCS, MSWCC, and the Yazoo Co. Soil and Water Conservation District to determine priority areas that are contributing significant pollutant loads to Ellison Creek	Target priority areas for BMPs	Month 1-36
Establish Watershed Implementation Team.	Establish WIT	Month 1-2
Initiate watershed monitoring	Baseline Condition Monitoring	Completed using historical data

Meet with landowners and cooperators to secure commitments to install BMPs in priority areas	Landowner Commitment	Months 1-36
Establish routine meeting schedule for WIT to support WBP revision	WIT Meetings	Months 1-36
Implement BMPs	BMP Instillation	Months 1-36
Coordinate with Landowners to inspect BMPs that were installed using Section 319 funds	BMP Inspection	Months 1-36
Begin monitoring to collect data on post-BMP water quality	Post-BMP Monitoring	Months 40-48
Implement education and outreach plan	Education/Outreach events scheduled	Months 8-36
Finalize revised WBP	Final Revised WBP	Months 30-36

Goal: Reduce sediment loads entering waters in the Ellison Creek Watershed.

Element h: Load Reduction Evaluation

The *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ, 2021) do not include a water quality standard applicable to aquatic life protection due to sediment. However, a narrative standard for the protection of aquatic life was interpreted to determine an applicable target for the Ellison Creek TMDL. The narrative standard is that waters shall be free from materials attributable to municipal, industrial, agricultural, or other dischargers producing color, odor, taste, total suspended solids, or other conditions in such degree as to create a nuisance, render the waters injurious to public health, recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses. In lieu of numeric criteria for sediment, monitoring will be conducted to collect data on parameters that are considered surrogates for sediment concentrations and may include measurements for Total Suspend Solids, Total Suspended Sediment, and turbidity along with conventional parameters generally measured to determine aquatic health (e.g. Dissolved Oxygen, pH, Temperature, Conductivity). The following thresholds will be used to measure compliance with water quality criteria and/or target thresholds:

Success Measurement Thresholds:

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	<50 mg/l
Turbidity	<100 NTU
Total Suspended Solids	<80 mg/l
M-BISQ West Bioregion	Assessment threshold 43.7 (25th percentile of reference condition)

In addition to chemical data, biological community data and in stream habitat surveys will be collected over the course of the project 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. Mississippi uses a calibrated and verified index of biotic integrity to make water quality assessment decisions. This index, the Mississippi Benthic Index of Stream Quality (M-BISQ) was originally developed in 2000 and has undergone three recalibration efforts to refine the sensitivity of the index. As part of the index development process, the state was divided into unique bioregions. Within each bioregion, the index has a defined attainment threshold that is used to determine if the biological community measures collected at a site are representative of good water quality that can support a balanced benthic macroinvertebrate community. If the score is above the attainment threshold for the bioregion, the site is assessed as attaining the aquatic life use designation. Ellison Creek is in the West bioregion and the attainment threshold is 43.7. Along with overall MBISQ scores, the in-stream habitat surveys will also be used to determine change over time.

It should be noted that recovery time of a stream is variable and may extend beyond the timeframe identified in the workplan. At the end of the project, data will be analyzed to determine if the data indicate improvements to water quality in Ellison 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.

Element i: Monitoring

Prior to BMP installation, pre-implementation water quality chemical and biological monitoring will be collected to serve as baseline data for the project along with any historical data available in Ellison Creek. Water quality monitoring will include water chemistry data (nutrients, suspended solids, oxygen demand, chlorides, etc.), in-situ field measurements for such parameters as dissolved oxygen, pH, temperature, specific conductance, and turbidity, datalogger (sonde) deployment for continuous in-situ field measurement data as well as biological community monitoring for benthic macroinvertebrates. A list of this historical water quality monitoring in the Ellison Creek Watershed is provided in the table below and their sample locations are shown in Figures 1 and 2.

Station ID	Water Body	Sample Year(s)	Collecting Agency	Project	Water Chem	In-Situ	Sonde	Benthics
BB071	Ellison Creek	2001	MDEQ	M-BISQ	X	X		X

Monitoring locations will be selected using best professional judgment and will be targeted to reflect water quality downstream of BMP activity. Once BMP installation is complete, and there has been sufficient time for the stream to stabilize, post BMP monitoring will be initiated. Post BMP monitoring will be conducted in a way that allows for comparison with the pre-implementation data. Because recovery periods of streams can be dependent on type and amount of BMPs installed, more than 1 year of post BMP data may be needed to observe a change in water quality. In some cases, it may take 5 or more years to see full benefits of BMPs. All data collection efforts will be conducted using trained personnel following established Standard Operating Procedures and adhering to agency Quality Assurance protocols.