Sherman Creek-Panola Quitman Floodway Watershed Plan
9 Key Element Plan
HUC 080302020306
MWS 9336
GY18 Proposed Project Area
December 6, 2018

Element a: Identification of Causes and Sources of Impairment

The Sherman Creek –Panola Quitman Floodway Watershed is located in the northern portion of Tallahatchie County in North Mississippi covering approximately 33,139 acres. According to the 2011 National Land Cover Database (NLCD), the landuse within this watershed is comprised of approximately 55% cropland, 16% wetlands, 19% forestland, and 9% other (water, scrub/barren, pastureland and urban) (Figure 1). This watershed is unique in the fact that part of it lies within the bluff hills and the other part is in the Mississippi delta. Only 23.5% of the watershed falls within the Bluff Hills Region of the Yazoo Basin while the majority, 76.5%, is located within the Delta Region. The location of the watershed places the Sherman Creek-Panola Quitman Floodway watershed into two different ecoregions. The Hills portion falls within the Mississippi Valley Loess Plains ecoregion and the Delta portion falls within the Mississippi Alluvial Plain ecoregion (commonly referred to as the Delta). The change in ecoregions can also be seen in Figure 1 as it corresponds with drastic changes in landuse as the hilly upland area falls off into the flatter land used for agricultural purposes.

The Sherman Creek –Panola Quitman Floodway Watershed has a long history with Mississippi's Section 303(d) List of Impaired Water Bodies beginning with the original listing of the Sherman Creek Drainage Area (DA) in 1996 (MS270E). The Buntyn Creek DA (MS271E) and the Panola Quitman Floodway (MSPQWAYE) were also included as impaired segments on the Section 303(d) list and are located within the Sherman Creek – Panola Quitman Floodway Watershed. The entire drainage areas for all of these were considered as "evaluated" §303(d) listings versus "monitored" listings as there were no water quality data to verify impairment status of the water bodies in the watershed. The State of Mississippi Section 303(d) List of Impaired Water Bodies identified the impairments were caused by pesticides, siltation, nutrients, and organic enrichment (OE) / low dissolved oxygen (Low DO). In 2002, the Sherman Creek drainage area was replaced with East Levee Creek on the list as it captures the majority of the drainage in the watershed. East Levee Creek retained the segment identifier of MS270E along with the previously identified causes of pesticides, nutrients, siltation, and organic enrichment (OE)/low dissolved oxygen (Low DO).

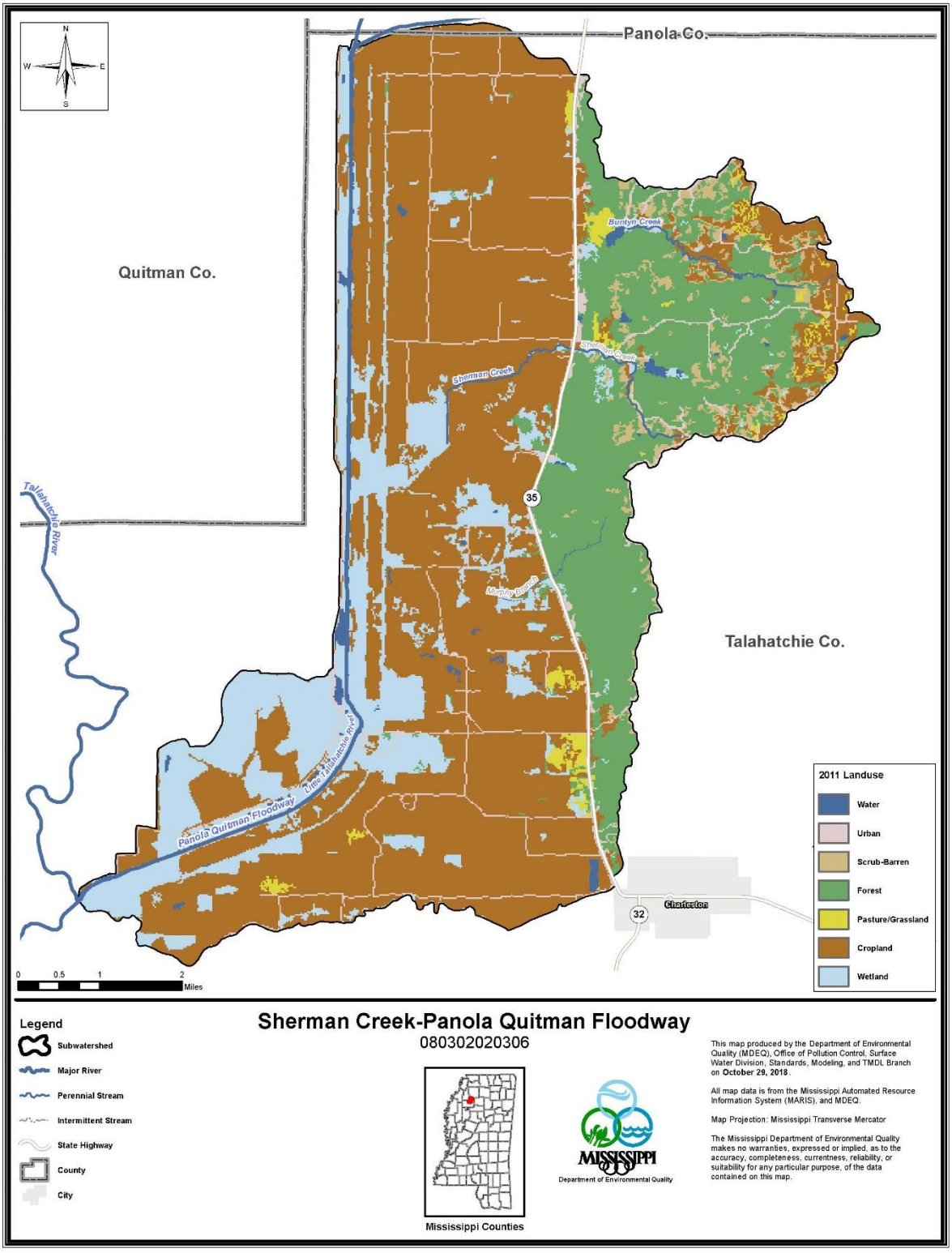

Figure 1: Sherman Creek-Panola Quitman Floodway Watershed Landuse Map, 2011 NLCD

There are several Total Maximum Daily Load (TMDL) reports for water bodies within the Sherman Creek-Panola Quitman Floodway Watershed (HUC 080302020205). One of the TMDLs is *Total Maximum Daily Load Yazoo River Basin Delta Region for the Delta Region*. Both East Levee Creek (MS270E) and Panola Quitman Floodway (MSPQWAYE) are included. This TMDL was completed for sediment. The *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ, 2016) regulation does not include a numerical 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) and calls for an 80 to 85% reduction in sediment.

A separate sediment TMDL was developed for waters that fall outside the boundaries of the Mississippi Alluvial Plain ecoregion. Buntyn Creek (MS271E) is included in the *Total Maximum Daily Loads For Yazoo River Basin, Mississippi Hills Region For Sediment*. This TMDL was also completed for sediment and has the same water quality standards as the aforementioned TMDL. The Hills region TMDL calls for a sediment reduction of 98 to 99%.

There are no facilities in the Sherman Creek-Panola Quitman Floodway 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 these TMDLs. However, these contaminants would also be controlled by the same best management practices (BMPs) that control the sediment from nonpoint sources of pollution.

Nonpoint loading of sediment in a water body results from the transport of the material into receiving waters by several processes including mass wasting, head cutting, gullying, and sheet and rill erosion. Sources of sediment come from improper agricultural and silvicultural practices as well as from a plethora of other improper land-use activities, e.g. construction, mining, channel alterations.

East Levee Creek also has a TMDL entitled *Total Maximum Daily Load Total Nitrogen and Total Phosphorus For East Levee Creek*. Mississippi does not have water quality standards for allowable nutrient concentrations; however, MDEQ is currently working in conjunction with a Nutrient Task Force (NTF) on the development numeric nutrient criteria. To meet the target nutrient concentrations, the TMDL calls for a Total Phosphorus (TP) reduction of 96.42 % and Total Nitrogen (TN) reduction of 88.36%.

The Panola Quitman Floodway has a separate TMDL entitled *Total Maximum Daily Load Total Nitrogen, Total Phosphorus, and Organic Enrichment/Low Dissolved Oxygen For Panola Quitman Floodway*. To meet the target nutrient concentrations, the TMDL calls for a TP reduction of 97.16 % and TN reduction of 90.73% in this waterbody.

Figure 2 shows all of the impaired segments in the Sherman Creek – Panola Quitman Floodway Watershed along with locations of established monitoring stations in the watershed.

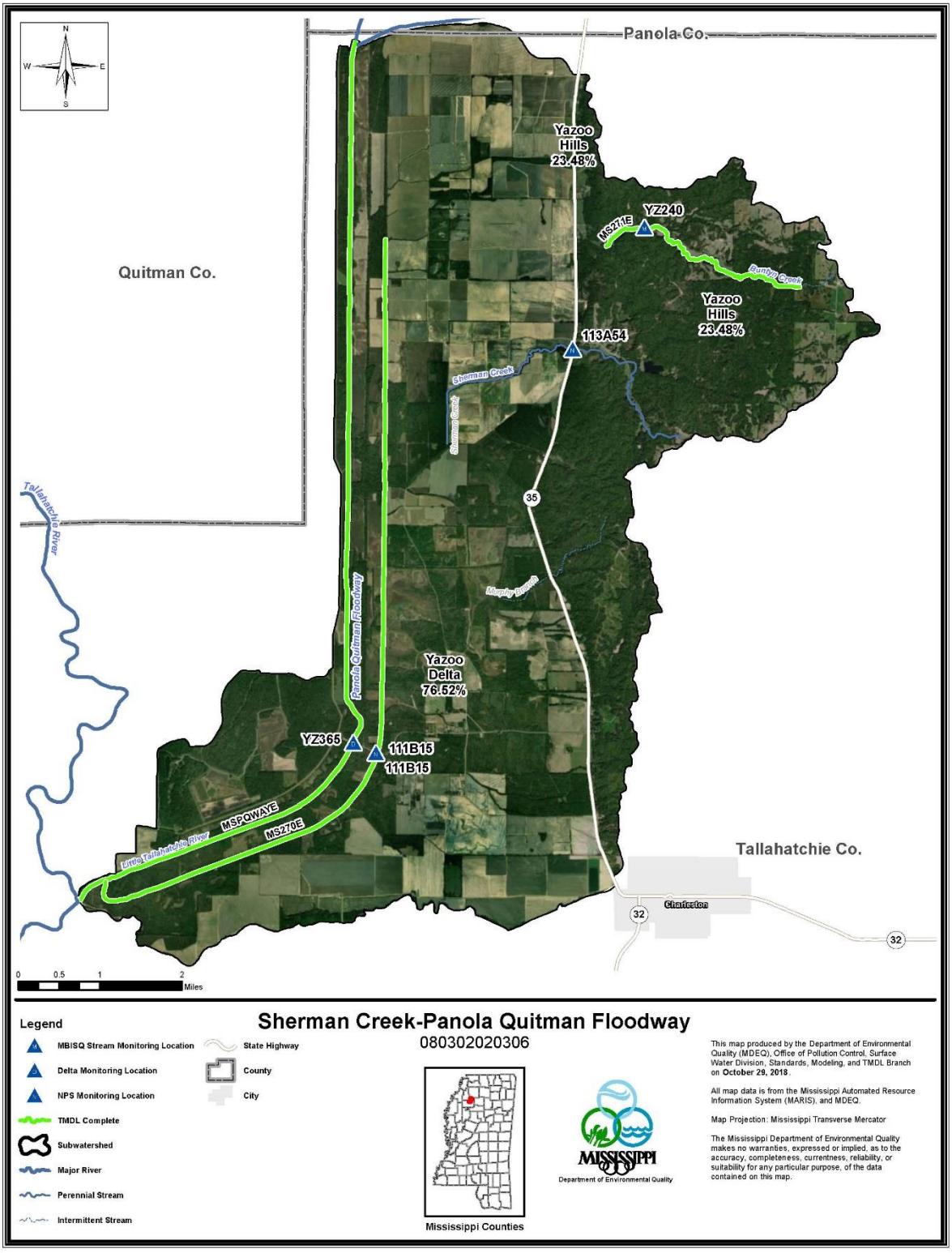

Figure 2: Sherman Creek-Panola Quitman Floodway Watershed Impaired Segments, Monitoring Sties, and Hills/Delta Border

Element b: Expected Load Reduction

The *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters* (MDEQ, 2016) 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 sediments TMDLs in the Sherman Creek – Panola Quitman Floodway 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 which includes both East Levee Creek (MS270E) and Panola Quitman Floodway (MSPQWAYE) concluded that sediment yields would need to be reduced by 80-85% in the watershed. The Buntyn Creek (MS271E) sediment TMDL called for a reduction in yields by 98 to 99%. 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.

At the time of nutrient TMDL development for both East Levee Creek and the Panola Quitman Floodway, and is presently the case, MDEQ does not have numeric nutrient criteria. To develop the TN and TP targets a percentile approach was used following EPA recommendations. The target values are subject to revision upon the adoption of numeric nutrient criteria or recommendations from the Nutrient Technical Advisory Group. The Total Nitrogen and Total Phosphorus TMDL for East Levee Creek (MS270E) recommended Total Phosphorus (TP) needs to be reduced by 96.42 % with a target annual concentration of 0.09 mg/L and a reduction of Total Nitrogen (TN) to be 88.36% with an annual target concentration of 0.58 mg/L. The Total Nitrogen, Total Phosphorus, and Organic Enrichment/Low DO TMDL for Panola Quitman Floodway (MSPQWAYE) calls for a 97.16% reduction of Total Phosphorus with a target concentration of 0.09 mg/L and a reduction of Total Nitrogen by 90.73% and a target concentration of 0.58 mg/L.

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.

The NRCS has a list of approved BMPs to address nutrients and sedimentation. This list will be used to identify candidate BMPs in Sherman Creek-Panola Quitman Floodway.

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 and nutrient issues in the Sherman Creek-Panola Quitman Floodway watershed helping the stream recover: fencing, watering facilities, ponds, streambank and shoreline protection, dikes, critical area planting, grade stabilization structures, forage and biomass planting, structures for water control, or any other practices to help reduce sedimentation and nutrient loading. 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 TMDLs (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; and
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 that may contribute match include MSWCC, Tallahatchie County Soil and Water Conservation District, NRCS, USGS (monitoring), 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

Practice Name	No of Units	Unit	Unit Cost	Estimated Cost	Estimated Match
Cover Crops	750	ac	$70.00	$52,500.00	$35,000.00
Critical Area Planting	20	ac	$196.00	$3,920.00	$2,613.33
Dike	8,000	ft	$3.87	$30,960.00	$20,640.00
Pond	8	ea	$5,381.00	$43,048.00	$28,698.67
Fence	25,000	ft	$2.25	$56,250.00	$37,500.00
Grade Stabilization Structure	90	ea	$7,700.00	$693,000.00	$462,000.02
Forage and Biomass Planting	200	ac	$151.00	$30,200.00	$20,133.33
Heavy Use Area Protection	6,000	ft	$4.00	$24,000.00	$16,000.00
Streambank and Shoreline Protection	8,000	ft	$128.82	$1,030,560.00	$687,040.03
Structure for Water Control	35	ea	$3,500.00	$122,500.00	$81,666.67
Watering Facility	15	ea	$8,900.00	$133,500.00	$89,000.00
*Monitoring				$164,656.00	
*Education/Outreach				$161,700.00	$70,000.00
*Technical Assistance				$75,000.00	$50,000.00
*Project Management, Implementation, Coordination, Plan Revision				$245,713.80	

Total Estimated Project Cost **$2,867,507.80**

Total Estimated Project Match **$1,600,292.07**

* -Denotes fields that are estimated upon five incremental funding cycles of the project

Due to the magnitude of this project, it will need to be incrementally funded. In order to fully address all suggested conservation needs in the watershed, this plan recommends funding be provided in 5 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

Practice Name	No of Units	Unit	Unit Cost	Estimated Cost	Estimated Match
Critical Area Planting	5	ac	$196.00	$980.00	$653.33
Dike	1,000	ft	$3.87	$3,870.00	$2,580.00
Pond	1	ea	$5,381.00	$5,381.00	$3,587.34
Fence	1,258	ft	$2.25	$2,830.50	$1,887.00
Grade Stabilization Structure	12	ea	$7,700.00	$92,400.00	$61,600.03
Forage and Biomass Planting	40	ac	$151.00	$6,040.00	$4,026.67
Streambank and Shoreline Protection	500	ft	$128.80	$64,400.00	$42,933.35
Structure for Water Control	4	ea	$3,500.00	$14,000.00	$9,333.34
Watering Facility	2	ea	$8,900.00	$17,800.00	$11,866.67
Monitoring				$74,656.00	
Education/Outreach				$63,900.00	$30,000.00
Technical Assistance				$15,000.00	$10,000.00
Project Management, Implementation, Coordination, Plan Revision				$25,300.00	

Phase 1 Estimated Project Cost **$386,557.50**

Phase 1 Estimated Project Match **$178,467.74**

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, namely; 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 Sherman Creek-Panola Quitman Floodway watershed project by tailoring them to address the sedimentation and nutrient loading. 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 Sherman Creek-Panola Quitman Floodway 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 Sherman Creek-Panola Quitman Floodway 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

In the event of a Section 319 NPS funding award from MDEQ to support implementation of this watershed-based plan for this HUC 12 sub-watershed, MDEQ, along with support from the Watershed Implementation Team and Project Manager (where applicable), will:

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 Tallahatchie 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, USGS, and the Tallahatchie Co. Soil and Water District to determine priority areas that are contributing significant pollutant loads to Sherman Creek-Panola Quitman Floodway Watershed	Target priority areas for BMPs	Months 1-2
Establish Watershed Implementation Team to begin refinement of Watershed Based Plan for Sherman Creek-Panola Quitman Floodway Watershed	Establish WIT	Months 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 1-6
Establish routine meeting schedule for WIT to support WBP revision	WIT meetings	Months 1-36
Implement BMPs	BMP installation	Months 3-36
Coordinate with Landowners to inspect BMPs that were installed using Section 319 funds	BMP Inspection	Months 3-36
Begin monitoring to collect data on post-BMP water quality	Post-BMP Monitoring	Months 42-48
Finalize education and outreach plan	Education/Outreach events scheduled	Months 8-36
Finalize revised WBP	Final Revised WBP	Months 30-36

Element h: Load Reduction Evaluation

The State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters do not include a water quality standard applicable to aquatic life protection due to sediment or nutrients. However, a narrative standard for the protection of aquatic life was interpreted to determine an applicable target for the Yazoo River Basin Delta Region TMDL and the Yazoo River Basin Hills Region TMDL. The narrative standard states 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 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:

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
Total Nitrogen	0.58 mg/L annual concentration (numeric threshold established by TMDLs for Panola Quitman Floodway and East Levee Creek)
Total Phosphorus	0.09 mg/L annual concentration (numeric threshold established by TMDLs for Panola Quitman Floodway and East Levee Creek)
M-BISQ West Bioregion	43.7 Calibration 3 (Applicable to waters outside the Mississippi Alluvial Plain)

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 trends in water quality and should provide information to help determine if the implementation activities are resulting in water quality improvements. For freshwater wadeable streams, not including the Mississippi Alluvial Plain (i.e. Delta), 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. In the Hills region, Buntyn Creek is located in the West bioregion and was determined to be impaired in 2002 compared to the bioregional reference conditions. Along with overall MBISQ scores, the in-stream habitat surveys will also be used to determine change over time. As noted above, for the Delta region, a calibrated multi-metric index of biological integrity is not available at this 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 the Sherman Creek-Panola Quitman Floodway watershed. 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 have been compiled from 2002-2015 to serve as baseline data for the project along with any historical data available on Sherman Creek, Buntyn Creek, East Levee Creek, and Panola Quitman Floodway. This varied water quality monitoring included 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 in wadeable Hill region streams and algal/periphyton chlorophyll-a in support of Delta nutrient criteria development. A list of this historical water quality monitoring in the Sherman Creek-Panola Quitman Floodway 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 and/or Algal
111B15	East Levee Creek	2007, 2008, 2015	USGS, MDEQ	Delta Nutrient, Delta Bluff Hills Nutrient	X	X	X	X
113A54	Sherman Creek	2015	USGS, MDEQ	Delta Bluff Hills Nutrient	X	X	X	X
YZ240	Buntyn Creek	2002	MDEQ	MBISQ	X	X		X
YZ365	Panola Quitman Floodway	2002, 2007	MDEQ, USGS, USCOE	Delta Pilot IBI, Delta Nutrient	X	X		X

Post-BMP monitoring locations will be selected using best professional judgement 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.