

Dry Creek Watershed Plan**9 Key Elements****HUC 03170040603****MWS 4111****GY16 Proposed Project Area****May 08, 2017 – Revision 02****Element a: Identification of Causes and Sources of Impairment**

The Dry Creek watershed is located in Covington County and covers 13,224 acres. This watershed contains many landuse types including agricultural land, pastureland, and forest areas; however, the dominant landuses identified in the 2011 National Land Cover Database (NLCD) within the watershed are forest (55.7%) and pasture/grass (31.7%) (Figure 1).

In order to make water quality assessments on wadeable streams outside of the Mississippi Alluvial Plain, MDEQ uses a calibrated and verified index of biological integrity (IBI) referred to as the [Mississippi Benthic Index of Stream Quality \(M-BISQ\)](#). Using biological community data and comparing it to the attainment thresholds from the M-BISQ, Dry Creek was assessed as impaired (segment ID MS082E) and was placed on the Mississippi 2002 Section 303(d) List of Water Bodies for biological impairment. MDEQ has a strong team of scientists and engineers focused on evaluating water quality data and identifying stressors in water bodies that have been listed as being biologically impaired using benthic macroinvertebrate community data. If biological community data indicate that a water body segment is impaired, an investigative, stressor identification analysis using a strength-of-evidence approach is conducted to determine the cause(s) of the impairment. Such causes may range from specific pollutants (e.g. Total Nitrogen) to other causes of pollution such as sedimentation, habitat loss or hydrologic alteration. In most cases, nonpoint sources contribute, or are the primary causes of impairment. MDEQ relies upon all available monitoring and assessment data and conducts additional monitoring to gather the necessary data and information to help determine both the causes and sources of impaired waters. The *U.S. Environmental Protection Agency (EPA) Stressor Identification Process and Stressor Identification Guidance Document* (USEPA, 2000), is used to identify most probable stressors causing biological impairment to provide the information necessary to develop required TMDLs that will guide restoration activities. A stressor identification study was completed on Dry Creek. Sediment was identified as the most likely cause of the impairment and a [sediment TMDL](#) was developed.

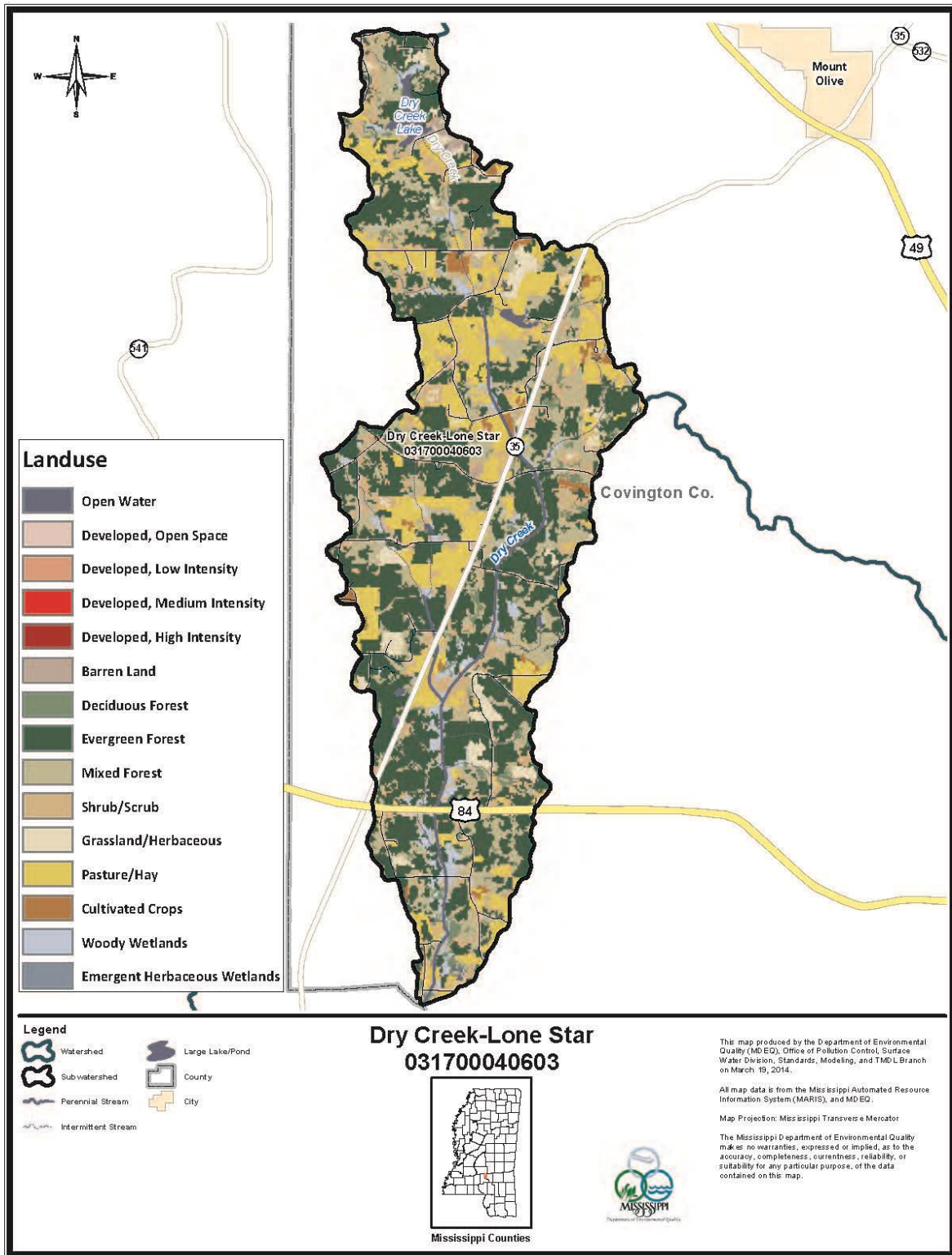


Figure 1: Dry Creek Watershed Landuse Map, 2011 NLCD

There are no facilities in the Dry 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. The pollutant of concern for the Dry Creek TMDL is sediment from land-use runoff and in-channel processes and the TMDL was developed for clean sediment. Certain contaminants may be associated with sediment such as pesticides and nutrients. These contaminants were not addressed directly within this TMDL. However, these contaminants would also be controlled by the same best management practices (BMPs) that control the sediment from nonpoint sources of pollution. The target for the TMDL was based on reference sediment yields developed by the Channel and Watershed Processes Research Unit (CWPRU) at the National Sedimentation Laboratory (NSL). Based on the ranges of stable and unstable yield values, a reduction in sediment of 55% to 66% is recommended in the Dry Creek watershed.

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, Historical landuse activities and channel alterations.

The most recent landuse data (NLCD 2011) attributes the landuse in the Dry Creek Watershed to be predominantly forest at 55.7%. Since 2011, much of the forest in this watershed was harvested and the land has been converted to pasture to support grazing operations. Figure 2 shows aerial imagery depicting the change in forest coverage from 2010 to 2014. It is estimated that more than 1,400 acres have been converted from forest to pasture. Because of this recent landuse change, the BMPs installed in this project will focus on managing these newly converted pastures to mitigate the potential of increased sedimentation. Examples of potential BMPs include: fencing, watering facilities, heavy use areas, stream crossings, ponds, forage and biomass planting, establishment of permanent vegetation, sediment basins, and nutrient management practices.

Element b: Expected Load Reduction

The sediment TMDL for Dry Creek (MS082E) concluded that sediment yields would need to be reduced by 55%-66% in the watershed in order to reflect stable conditions. The NRCS has a list of approved BMPs to address sedimentation and this list will be used to identify candidate BMPs in Dry Creek.

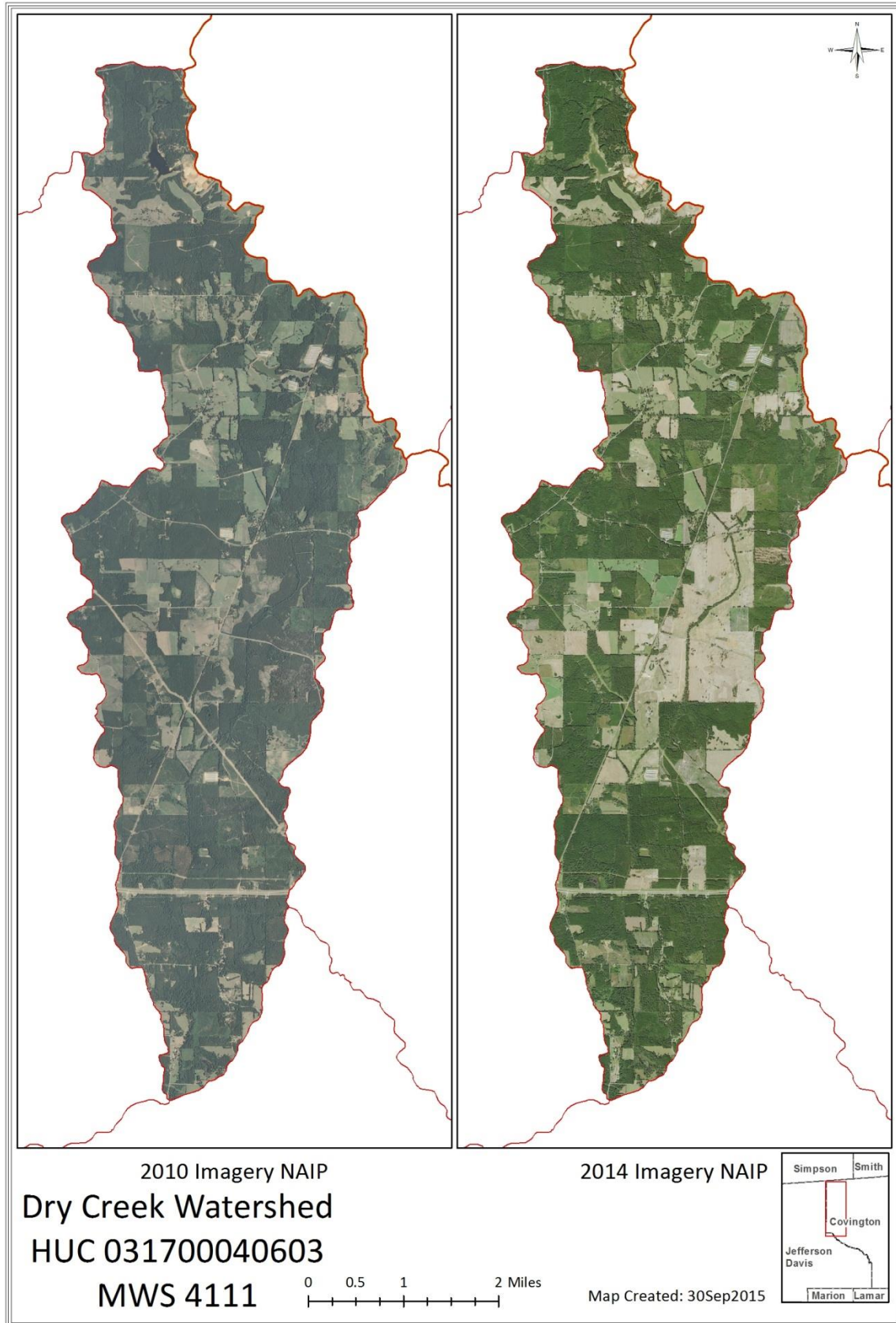


Figure 2: Landuse Change in Dry Creek Watershed from 2010 to 2014

Element c: Proposed Management Measures

Coordinating partners with MDEQ include the Mississippi Association of Conservation Districts (MACD), 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 Dry Creek watershed helping the stream recover: fencing, watering facilities, heavy use areas, stream crossings, ponds, sediment basins, establishment of permanent vegetation, forage and biomass planting, and nutrient management practices (lime and fertilizer). As stated above in Element a, much of the forest has recently been converted to pasture in this watershed. As such, BMPs will be prioritized for implementation in the newly converted pasture areas. Factors considered for determining specific locations for the placement of BMPs included the following attributes based upon best professional judgement:

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);

Upon receipt of funding, MDEQ will coordinate with Project Management staff to target implementation on recently converted land and then move to other pasture areas. A map depicting the landuse change from 2010 (the basis for the 2011 NLCD landuse calculations) to 2014 can be found in Figure 2. It can be seen that a large portion of forest was harvested and is being used as pasture for grazing purposes. Additional considerations for prioritization of BMPs included the positioning of BMPs with willing landowners; the increased likelihood for leveraging of in-kind services; and proximity to pollutant sources to Dry Creek. The priority areas for BMP implementation are shown in Figure 3.

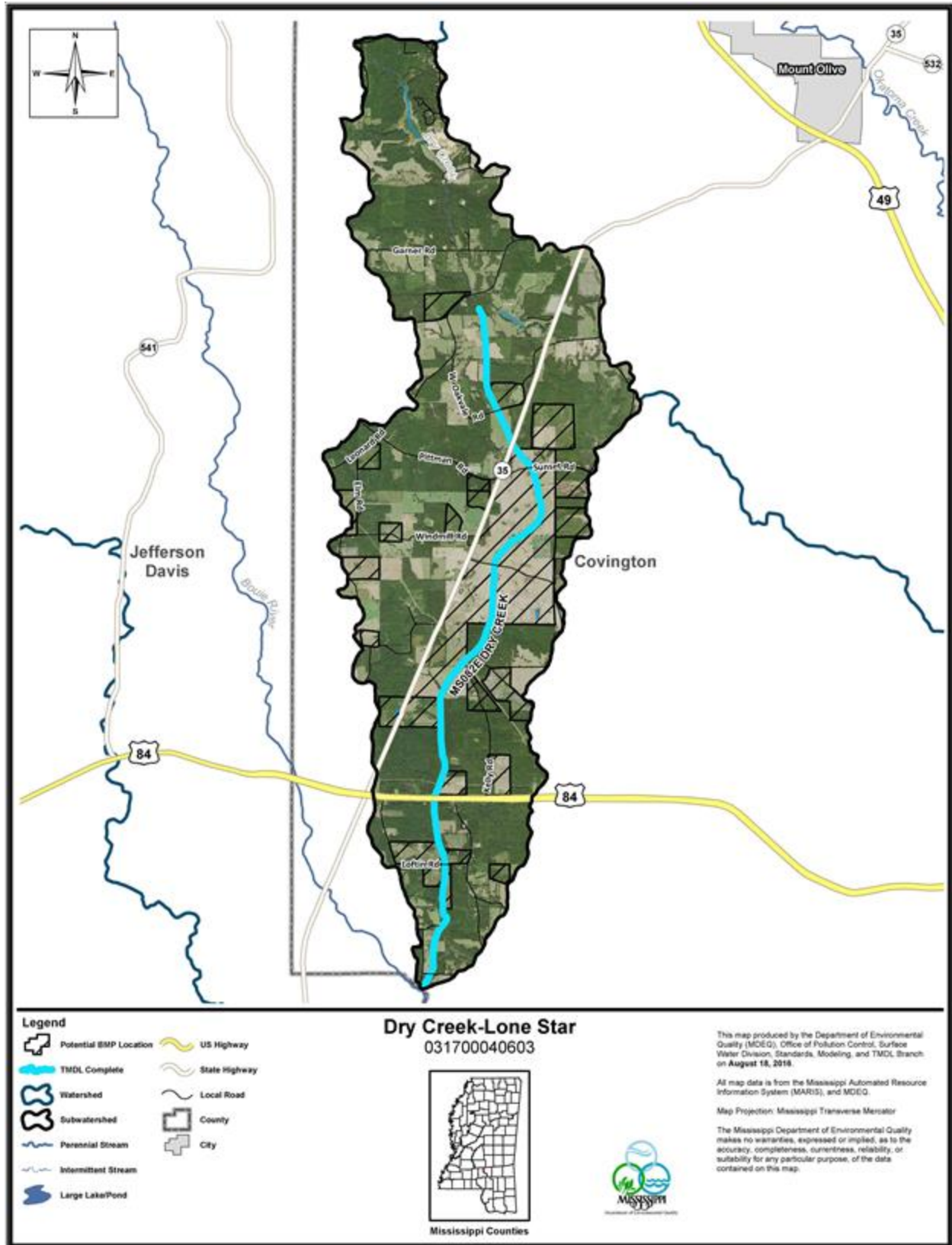


Figure 3: Dry Creek Watershed Priority Areas for BMP Implementation

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 MACD, MSWCC, Covington County Soil and Water Conservation District, NRCS, USGS (monitoring), and/or local landowners. 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 MACD to implement this project. Project partners provided the funding amounts used to estimate costs for BMP installation. Provided below is summary of estimated project costs:

Activity	Size/Amount	Estimated Cost	Landowner Match
BMPs			
Fencing	9,420 ft @ \$2.75/ft	\$25,905	\$10,362
Water Facilities	12ea @ \$1,304.86	\$15,658	\$8,000
Heavy Use Areas	12ea @ \$1,571.28	\$18,855	\$12,000
Stream Crossings	7 ea @ \$4,197.42	\$29,382	\$26,000
Ponds	7 es @ \$8,585.72	\$60,100	\$12,000
Sediment Basins	6 ea @ \$5,845.34	\$35,072	\$14,029
Nutrient Management	200 ac @ \$425	\$85,000	\$34,000
Critical Area Planting	9 ac @ \$773.83	\$6,964	\$2,786
Establishment of Permanent Vegetation	200 ac @ \$425	\$85,000	\$34,000
Forage and Biomass Planting	42.5 ac @ \$422.34	\$17,949	\$7,180
Education/Outreach		\$24,900	
Monitoring		\$13,000	
Project Management, Implementation, Coordination, Plan Revision		\$54,660	
Total Estimated Project Cost		\$472,447	\$160,356

To maximize education and outreach activities and monitoring efforts, MDEQ plans to leverage with existing programs already allocated for funding where possible.

Total estimated cost: **\$472,447**
 Total landowner match: **\$160,356 (40% of estimated cost)**

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 Dry Creek watershed project by tailoring them to address the sedimentation. 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 Dry Creek watershed are listed below:

- **Water Model Presentations** - Envirosapes 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.
- **Storm Drain Marking** - projects for scouts, environmental clubs, and citizen groups.
- **“Train the Trainer”** - workshops and materials for Soil and Water districts, Extension Service, etc.

As part of the education outreach efforts, the stakeholder group forming the Dry Creek Watershed Implementation Team (WIT) will participate in a minimum of 5 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 Covington County SWCD, MACD, 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, MACD, 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 13-42)
7. Conduct inspections of BMPs during construction (Months 3-36)
8. Coordinate with and support the local SWCD, MACD, 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, MACD, and the Covington Co. Soil and Water District to determine priority areas that are contributing significant pollutant loads to Dry Creek	Target priority areas for BMPs	Months 1-2

Establish Watershed Implementation Team to begin refinement of Watershed Based Plan for Dry Creek 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 6-36
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. However, a narrative standard for the protection of aquatic life was interpreted to determine an applicable target for the Dry 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, the monitoring will be conducted to collect data on parameters that are considered surrogates for sediment concentrations and may include measurements for Total Suspended 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:

Parameter	Threshold
Dissolved Oxygen	Daily Average of 5.0 mg/L; Instantaneous threshold of 4.0 mg/L
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

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 use 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. Dry Creek is in the East bioregion and the attainment threshold is 71.6. 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 Dry 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, water quality chemical and biological monitoring was conducted and will serve as baseline data for the project along with any historical data available on Dry Creek. Historical monitoring stations are shown in Figure 4. 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.

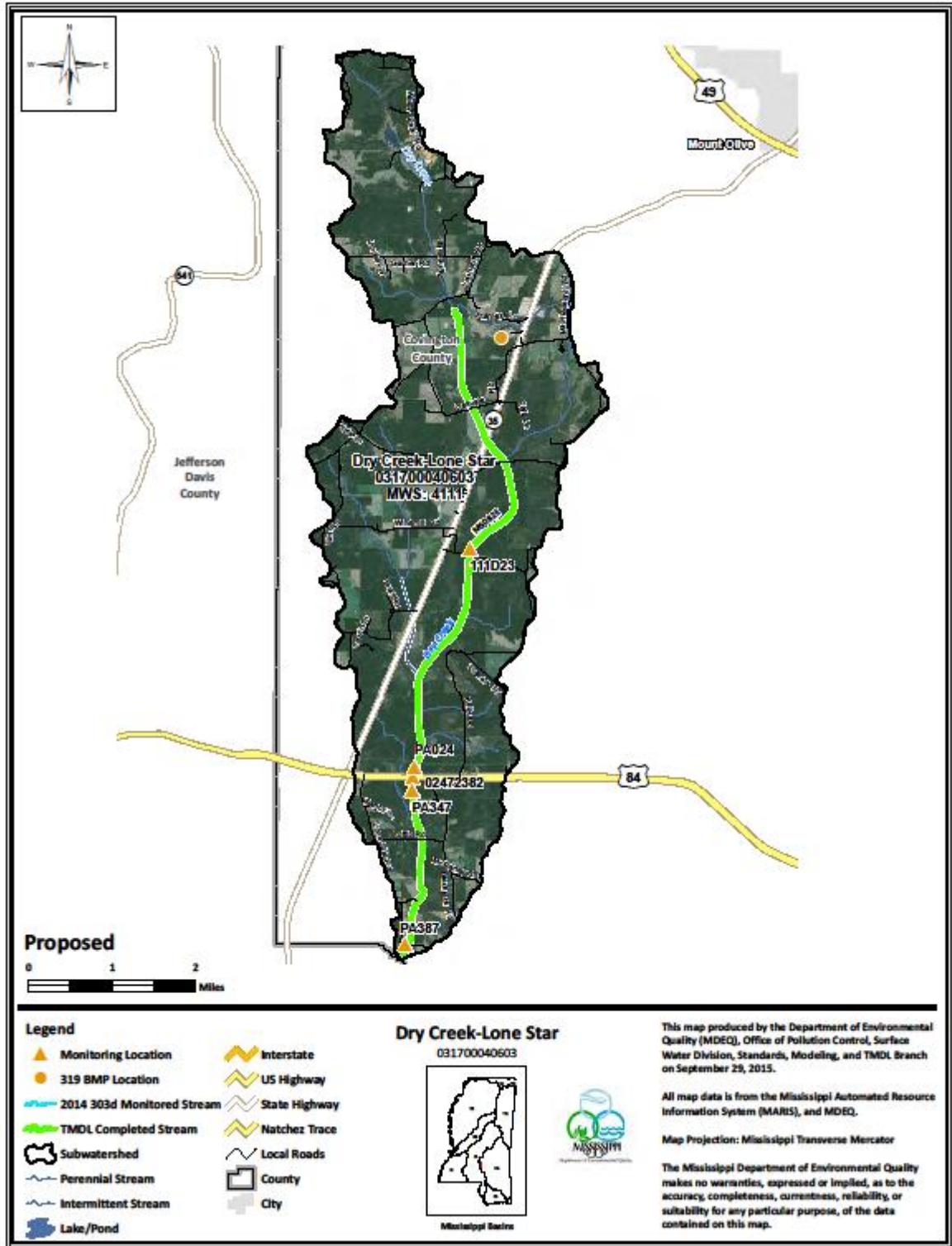


Figure 4: Dry Creek Watershed Historical Monitoring Stations