

2024 BMP Implementation Survey

Mississippi's BMP Implementation Monitoring Program

The Best Management Practices Implementation Monitoring Program was developed to provide a way to measure the voluntary use of BMPs in Mississippi. The Mississippi Forestry Commission conducts the BMP Implementation Survey on a three-year cycle.

Mississippi's Voluntary Silvicultural Best Management Practices Implementation Monitoring Program

> 2024 BMP Implementation Survey for Mississippi



Prepared by Mississippi Forestry Commission

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State Forester

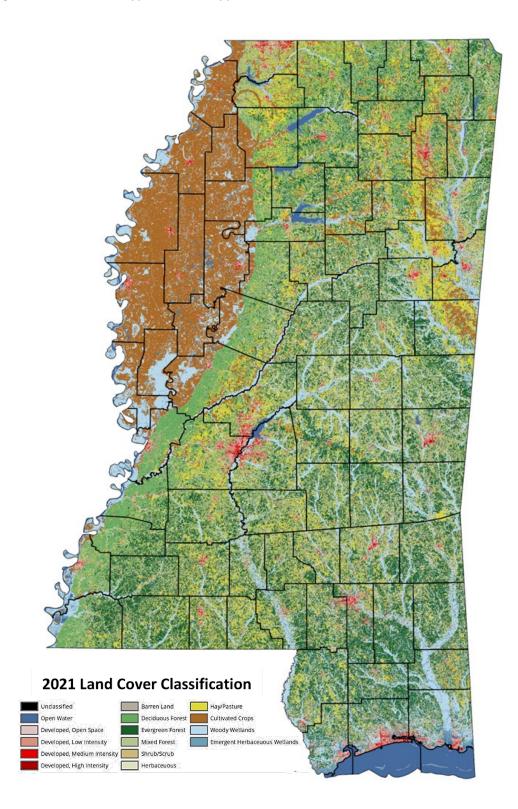


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Executive Summary

In 2024, the Mississippi Forestry Commission (MFC) conducted a field survey of best management practices (BMPs) voluntarily implemented on forestland in Mississippi. This report presents the results of that survey.

The guidelines set forth in "Silvicultural Best Management Practices Implementation Monitoring: A Framework for State Forestry Agencies" were used to develop the 2024 BMP Implementation Survey for Mississippi.

A total of 135 sites in 53 counties located in 8 basins in Mississippi having recent silvicultural activity were randomly selected to evaluate the voluntary implementation of best management practices. The Mississippi Forestry Commission utilized its own personnel to conduct the survey.

The following criteria were applied in selecting sites to be included in the survey:

- Forest harvesting activities occurring within 24 months.
- Sites must be at least 10 acres in size.
- Sites were selected without regard to ownership.

The 2024 BMP Implementation Survey results for Mississippi revealed that 96.06 percent of best management practices applicable to the survey sites were implemented in accordance with the guidelines published in the handbook *Mississippi's BMP – Best Management Practices for Forestry in Mississippi*. Figure 2 shows the BMP categories evaluated during the survey and the implementation results for each category.



2024 BMP Implementation Results

Figure 2: 2024 BMP Implementation Results

Introduction

Mississippi has nearly 20 million acres of forestland, covering two-thirds of the state's total land area. Forests make an important contribution to Mississippian's quality of life by providing jobs, forest products, livestock forage areas, wildlife habitat, scenic areas, recreational experiences, clean air, clean water, and many other social, economic, and health benefits.

The Clean Water Act of 1987 required that proper steps be taken to prevent water pollution. Mississippi's Silvicultural Best Management Practices (BMPs) were established as a result of the Clean Water Act of 1987. Best Management Practices are non-regulated, voluntary guidelines for silvicultural activities that, when properly applied will protect water quality from non-point source pollutants while maintaining site productivity. Non-point source pollution is defined in Section 319 of the Clean Water Act of 1987 as "pollution caused by diffuse sources that are not regulated as point sources and normally associated with agricultural, *silvicultural*, urban runoff, and runoff from construction activities, etc. Such pollution results in humanmade or human-induced alteration of the chemical, physical, biological, and radiological integrity of the water."



Figure 3: Wetlands along the Pearl River

The Best Management Practices Implementation Monitoring Program was developed to provide a way to measure the

voluntary use of BMPs in Mississippi. The program began in 1988 when the Department of Environmental Quality requested that the Mississippi Forestry Commission coordinate the development of voluntary best management practices for forestry in Mississippi. The Mississippi Forestry Commission worked with the Mississippi Forestry Association to put together a group of individuals representing a cross section of the forestry community to develop the guidelines. This group included landowners, loggers, forest industry, professional foresters, and the Department of Environmental Quality. Suggestions and comments from other states were also considered in the development of Mississippi's silvicultural BMPs.

Since the BMP guidelines inception, the Mississippi Forestry Commission has used some form of inspection on public and private lands. Currently, MFC employees utilize the same BMP Monitoring Inspection Form used for this survey to make sure all harvests on public lands meet BMP standards. This form is also used by MFC employees to ensure that all requests for Forest Resource Development Program (FRDP) cost-sharing money meet the BMP standard. Most wood industries are now SFI (Sustainable Forestry Initiative) certified. Therefore, their foresters also have a vested interest in following these same BMP guidelines. This BMP Implementation Survey can be viewed as a random audit of BMP practices on these lands and more.

The BMP guidelines were approved by the Mississippi Department of Environmental Quality and the Environmental Protection Agency and in 1989, published in the handbook *Mississippi's BMPs – Best Management Practices for Forestry in Mississippi.* Prior to this edition in 2019, the handbook was revised in 1995, 2000, 2008, and 2013.

2024 BMP Implementation Survey Procedure

Sampling Method

The 2024 BMP Implementation Survey is a statewide survey designed to assess statewide BMP compliance and not individual basin BMP compliance. Therefore, all results contained in this report are statewide results only.

The survey design from the Statistical Guidebook for BMP Implementation Monitoring produced by the Southern Group of State Foresters was used to determine the number of sample sites to visit. Based on an estimated overall percentage of implementation from past surveys, the sample size needed would have been 135 sites, in order to adequately represent forestry activity statewide and cover all basins.

The chosen period of time for this analysis was July 1, 2022, to July 1, 2024. Sentinel-2 imagery was used to locate harvesting operations. Satellite imagery was then used to verify that there was indeed a harvest at the selected sites. If not, the site was removed. It was then determined that 135 sites were needed. The primary survey sites were then randomly allocated within each Region. There were 135 sites manually selected for surveying using the sentinel-2 imagery, MFC foresters then visited the sites and collected the data using the survey 123 platform.

Eligible Survey Sites

Site selection criteria used for the 2024 survey were: (1) sites must have had some type of forest harvesting activity, either regeneration harvest or thinning, within a period of two years prior to the survey, (2) sites must be at least 10 acres in size, and (3) sites were selected without regard to ownership. The ownership of a site was determined after the site had been selected. This allowed for an unbiased selection and distribution of survey sites regarding ownership.

Survey Site Evaluation

For each site surveyed by MFC Foresters, 73 values were collected on each of the 8 BMP categories. The BMP categories are as follows:

- Streamside Management Zone (SMZ)
- Stream Crossings
- Permanent Roads
- Skid Trails/Temporary (Secondary) roads
- Site Preparation Activities
- Landings
- Wetlands
- Fireline Construction

If a value within a category did not apply to the survey site, it was recorded as Not Applicable (N/A). All other practices were considered applicable to the site and were evaluated on whether or not they were

implemented as specified in Mississippi's BMP handbook. This method of evaluation allowed each BMP category and, ultimately, the overall BMP implementation program, to be evaluated and the results expressed as a percent of applicable BMPs implemented.

The presence of a significant risk to water quality was noted for each best management practice evaluated. The forester evaluating the site used the following standard to determine the presence of a significant risk to water quality: Significant risk to water quality exists, if during a normal rainfall, sediment is likely to be delivered to a permanent water body. The presence of a significant risk did not mean that water quality was impaired on the site.

All information recorded for each BMP was based on observations made at the time of the inspection. The evaluation process did not include any assumptions concerning future activities on the site.

2024 BMP Implementation Survey Results

The 2024 BMP Implementation Survey revealed that 96.06 percent of best management practices applicable to the survey were implemented. The Total Statewide compliance of the survey was determined to be 95% at the 95% confidence level.

A total of 135 sites having recent silvicultural activity were randomly selected to evaluate the voluntary implementation of best management practices. A compilation of all survey data collected is found in Table 1: BMP Monitoring Inspection Form – State Totals (see pages 18-21).

General Tract Information

Silvicultural Activity

A regeneration harvest had occurred on 129 sites (95.56) of the 135 sites surveyed. The remaining 4.44 percent or 6 of the sites. Of the sites that had received a regeneration harvest, 67 (52%) had been artificially regenerated.

Tract Summary

The sites ranged in size from 10 acres to over 161 acres. Figure 4 shows the distribution of survey sites by tract size.

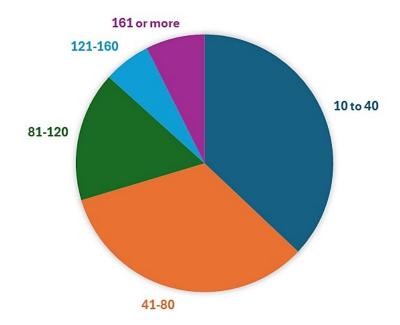


Figure 4: Distribution of survey sites by tract size by acre

Ownership Summary

The survey sites were distributed and selected without regard to ownership in order to ensure an unbiased sample. Ownership was determined after a site was located. Figure 5 shows the distribution of survey sites in regard to ownership classes.

The 135 survey sites were in the following four forest ownership groups:

Federal – (1 survey sites, approximately 1 percent of survey)

Forest Industry – 13(survey sites, 9 percent of survey)

Private Nonindustrial Forest Landowner (PNIF) (120) survey sites, 88.8 percent of survey)

State/Public – (1 Survey sites, 1% percent of survey)

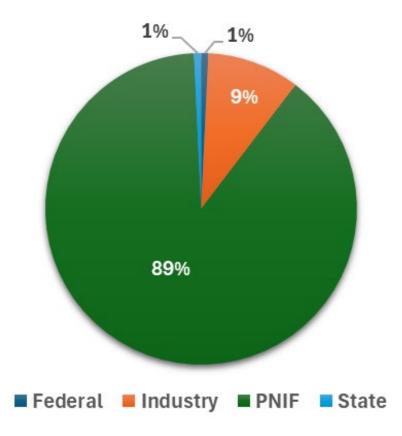


Figure 5: Survey Sites - Distribution by Ownership

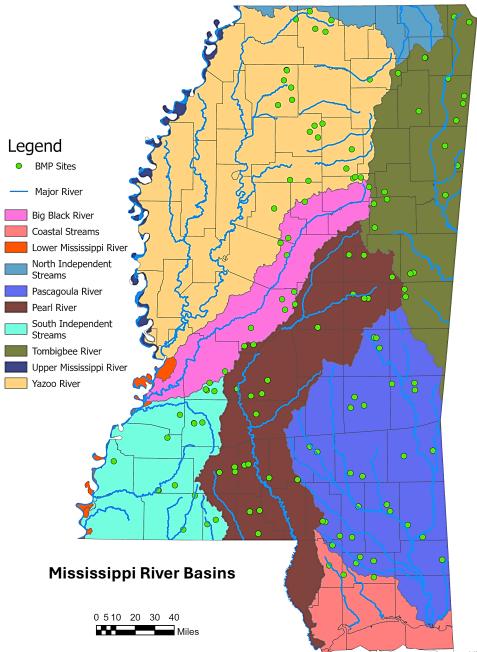
Counties

The BMP survey sites were randomly distributed across the state based on the potential need for BMPs. Survey sites were located in 53 of the 82 Mississippi counties. See Table 2: BMP Survey Sites by County, page 22.

River Basins

For each site inspected for BMP monitoring, the river basin containing the site was identified. Survey sites were located in 9 of Mississippi's river basins as delineated in the Mississippi Department of Environmental Quality's Basin Management Program. The river basins of Mississippi are shown below in Figure 6.

Figure 6: Mississippi River Basin



MFC GIS

Survey Sites with Applicable BMPs by Categories

The number of survey sites on which BMP categories were applicable is shown in Figure 7. See Table 3: Applicable BMPs by Category, page 23.

The BMP categories Landings, Skid Trails/Temporary Roads and Permanent Roads were applicable on far more survey sites than other categories. Landings had the highest number of applicable sites surveyed at 127 (91.85%). Skid Trails/Temporary Roads category had 124 sites surveyed for (91.85%). The Permanent Roads and landings categories were the next highest with Landings on of applicable sites surveyed 111 sites (82.22%) and Permanent Roads on 111 of the applicable sites (89.08%).

The three categories that fell in the middle of the applicable range were Streamside Management Zones, Stream Crossings, and Site Preparation. There were 91 sites (67.4%) in the Streamside Management Zone category that were applicable. The Stream Crossings category had 83 sites (61.5%) which were applicable, with 103 sites (76.3%) out of 135 total sites that had Site Preparation completed.

The two categories that had the least number of sites that applied were Wetlands and Firelane Construction. The Wetlands category only had 67 applicable sites (49.6%) while the Firelane Construction category only had 43 applicable sites (31.8%).

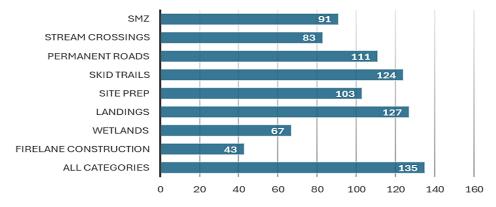


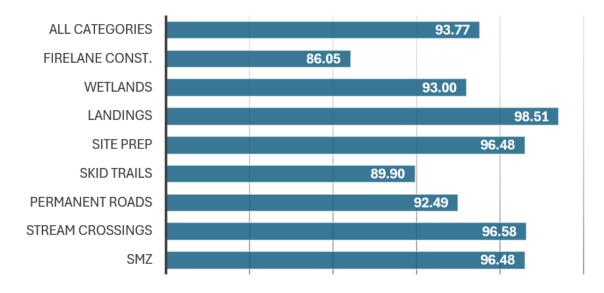
Figure 7: Number of Survey Sites by BMP category

BMP Implementation

Applicable BMPs were evaluated on whether they were implemented as specified in Mississippi's BMP handbook. Results showed that ninety-f percent of the best management practices were implemented on survey sites where they were applicable.

Implementation results were also evaluated by BMP category. Figure 8 shows the implementation results for each BMP category. The number and percent of all applicable BMPs implemented for each category is presented in Table 3: Applicable BMPs by Category, <u>page 23</u>.

The lowest percentage of BMPs implemented was found in Fireline Construction it had 86.05% of the 945 applicable BMP practices implemented, the Skid Trails/Temporary Road category was the next lowest with 89.90% of the 675 applicable practices implemented as specified. The Permanent Roads Category had 92.49% of the 1,485 applicable BMPs practices implemented, Streamside Management Zones had 96.48% of the 1,350 applicable BMP practices implemented, Wetlands had 92.06% of the 405 applicable BMP practices implemented, Site preparation had 96.48% of the 1,215 applicable BMP practices implemented, Landings had 98.51% of the 675 total applicable BMP practices implemented, and Stream Crossings had 96.58% of the 675 applicable BMP practices implemented.



2024 BMP Implementation Results

Figure 8: 2024 BMP Implementation Results

Significant Risk to Water Quality

Sites were evaluated for a significant risk to water quality each time a best management practice was determined to be applicable to the survey site. Of the 6,578 applicable BMPs evaluated, a significant risk to water quality was observed 25 times. These occurred on 11of the 174 sites surveyed. A complete listing of significant risks by individual best management practice is found in Table 1: BMP Monitoring Inspection Form – State Totals (see pages <u>18-21</u>). A summary of significant risk by BMP category is given in Table 4: BMP Categories with Significant Risks to Water Quality, <u>page 23</u>.

No significant risks to water quality were observed in relation to BMPs associated with half of the categories, including Landings Site Preparation, Wetlands, and Firelane Construction. One significant risk was observed in relation to BMPs associated with Streamside Management Zones involving sedimentation.

The following categories Stream Crossings, Permanent Roads, and Skid Trails/Temporary Roads had multiple significant risk to water quality that was observed. The Stream Crossing category had risks observed involving ditches dumping into streams and crossings stabilized during use. The Permanent Roads category risks involved the reshaping of the roads, side ditches dumping into a stream, roads located where side drainage could be achieved, rutting depth, grade specification, roads well drained and appropriate structures installed (bridges, culverts etc.) flat no grade roads avoided, and potential problem soils avoided. The significant risks found in the Skid Trails/Temporary Roads category involved stabilization, a lack of water control structures such as water bars and turnouts, rutting depth, and sensitive areas respected

Comparison of 2013, 2016, 2019, 2024 Survey

The 2024 survey results that exceed the 2019 survey results are in stream crossings and landings, these categories improved, while Streamside Management Zones, Permanent Roads, Site Preparation, Wetlands, and Firelane Construction decreased since 2019. Figure 9 shows a comparison of all BMP surveys from 2013 to 2024.

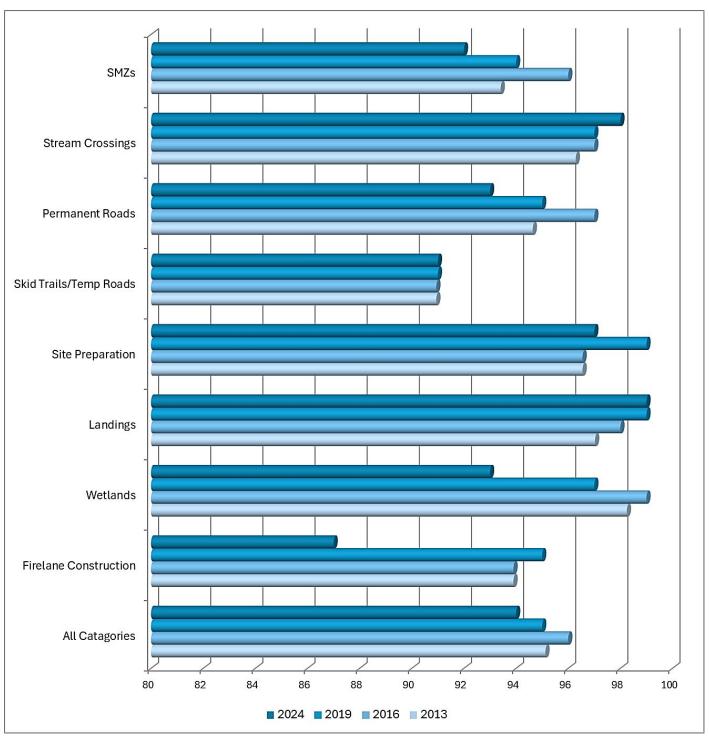


Figure 9: BMP Evaluation Comparison for All Surveys 2013 - 2024

Statistical Significance

A statistical analysis was completed following the survey. Figure 10 shows the statistical compliance of the survey. The total statewide compliance of BMP Implementation was determined to fall within 93.77% at the 95% confidence level. The metrics fell slightly higher for most of the individual categories. There were four categories that had slightly higher metrics, Landings 98.51%, Stream Crossings at 98.19%, SMZ and Site Preparation both were at 96.48%. Permanent roads were 92.49% compliant, Wetlands were 92.06 compliant, Skid trails/Temporary Roads were 89.90% compliant, and Fireline construction was the lowest of the bmp metrics at 86.05% compliant.

Areas that need improvement are permanent roads which are directly correlated to the statistical compliance discussed above are (Survey Question 5E and 7G) roads reshaped and or stabilized, and Roads well drained with appropriate structures, bridges, culverts, etc. (85.93%, and 89.62%). Wetlands compliance (Survey Question 9 C) mandatory BMPs followed (94.8%). Skid Trails/Temporary roads as discussed above were at 89.90% compliant and needed improvement in (Survey Question 6 D) Water bars, turnouts, and other water control structures present (72.90%). The lowest compliant area was Fireline construction with a compliant metric of 86.05%, (Survey Question 10 C, D, and E) water bars, turnouts, other water control structures properly installed (88.64%), Diversion ditches not constructed at the head of drain (74.42%), and Fireline's not constructed down the slope of natural gully (70.37%).

Conclusion

Our forests play an essential role in the protection of water quality. They absorb rainfall, filter pollutants and recharge underground water supplies. Forests produce much of the clean water we need for recreation and support of fish and wildlife habitats as well as the drinking water supply for millions of Americans.

Our forests make tremendous contributions to the economy and help to filter and protect our water quality. Voluntary best management practices are utilized in Mississippi to help ensure that our water quality is protected. Studies have shown that BMPs work when applied properly on a landowner's property.

The Mississippi Forestry Commission's 2024 BMP Implementation Survey for Mississippi was conducted to assess the implementation of the voluntary BMPs in the State. Steady progress has been made in the protection of the state's water resources over the years. Through continued education and training, as well as more diligent BMP implementation, the stabilization issues found in this survey can easily be remedied.

It is essential that the forestry community continue its efforts to protect water quality and monitor protection efforts. The Mississippi Forestry Commission, Southern Group of State Foresters and National Association of State Foresters are committed to protection of our forests and water through the use of routine assessments of protection measures implemented by the forestry community.



BEST MANAGEMENT PRACTICES FOR FORESTRY IN MISSISSIPPI

Appendix



Table 1: BMP Monitoring Inspection Form - State Totals

1. General Tract Information

Silvicultural Activity:	Tract Size (Acres):		Owner	ship Group:		
Regeneration Cut 12	29 10-40 50	121-160	8 PNIF	120	Federal	1
Thinning	6 41-80 45	161 or more	10 State	1	Industry	13
N/A	81-120 22					
Mississippi's River Ba	isins:					
Big Black 15	Coastal Streams 3	Yazoo River	24	North Independe	nt Streams	0
Pascagoula 28	Tombigbee 21	Pearl River	26	Tennessee River		2
Upper Mississippi 0	Lower Mississippi 0	South Independent S	treams 16			
2. Site Characteris	stics					
Estimated Slope Present: I	Predominant Soil Texture:	Erodib	ility Hazard:	Type of Stre	am Present:	
0% - 5% 58	Clay 17 Sandy Lo	am 60 Low	45	Perennial	17	
6% - 20% 62	Clay Loam 33 Sand	18 Mediu	m 84	Intermittent	54	
21% - 40% 14	Loam 6 Silty Soils	5 1 High	6	Ephemeral	9	
40% or greater 1				N/A	41	
Distance to Nearest Permanent Water Body:	Evidence of Spills or Fuels Ons		Oil Cans, Hoses or Containers Left Ons	Has Tract Be ite: Regenerated	een d Artificially?	
300 feet or less 28	Yes 1	Yes	1	Yes	67	
³⁰¹ feet to 800 16	No 134	No	134	No	60	
801 - 1600 feet 23				N/A	8	
1,601 or greater 68						

3. Streamside Management Zone

- A. SMZ width established according to BMP specifications
- B. Harvesting/ thinning within SMZ according to BMP specifications
- C. SMZ integrity honored (no chemicals, fertilizer, burning, log decks within SMZ)
- D. Stream course clear of logging debris
- E. SMZ free of roads and landings
- F. Stream free of sediment due to silvicultural activity
- G. Rutting through streams or drains avoided
- H. Prescribed burning avoided
- I. Blocking the natural flow of water avoided
- J. Stream bank integrity honored

Section Total

Percent Compliance

96.48

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4. Stream Crossings

- A. Ditches that dump into streams avoided
- B. Streams crossing properly installed
- C. Number of stream crossing minimized
- D. Stream or drain crossing at right angle only
- E. Stream crossing stabilized during use

N/A	YES	NO	SIG. RISK
52	79	4	0
75	59	1	0
68	67	0	0
74	61	0	0
74	60	1	0

Section Total

Percent Compliance

326

98.19

6 0

5. Permanent Roads

- A. Road respect sensitive areas
- B. Rutting depth does not exceed six inches for more than fifty (50) feet
- C. Roads located where side drainage can be achieved
- D. Roads wide enough to achieve surface drying
- E. Roads reshaped and/or stabilized
- F. Roads meet grade specifications
- G. Roads are well drained with appropriate structures (bridges, culverts, etc.)
- H. Side ditches do not dump into streams
- I. Flat no grade road avoided
- J. Streambeds, rocky places, and steep slopes avoided
- K. Potential problem soils avoided

Section Total

Percent Compliance

92.49

6. Skid Trails/ Temporary (Secondary) Roads

- A. Sensitive areas respected
- B. Majority of skid grades (steepness) below fifteen percent
- C. Rutting does not exceed six inches for more than fifty feet
- D. Water bars, turnouts, and other water control structures present
- E. Roads and skid trails are stabilized

N/A	YES	NO	SIG. RISK
14	116	5	
13	118	4	
16	108	11	
27	78	29	1
8	114	13	
		-	
	534	60	1

1072

Section Total

Percent Compliance 89.90

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N/A	YES	NO	SIG. RISK
25	108	2	
32	90	13	
24	109	2	
24	109	2	
26	90	19	
26	100	8	1
37	84	14	
40	83	12	
36	95	4	
30	101	4	
24	103	7	1
		_	

87

2

7. Site Preparation

- A. Sensitive areas respected
- B. Contour followed
- C. SMZ integrity honored (no chemical, fertilizer, burning, log decks) within SMZ
- D. Soil disturbance kept to a minimum
- E. Excessive soil compaction avoided
- F. Does it appear that chemicals were used to label specifications
- G. Disturbance on slope minimized
- H. Water diverted from site prep area to vegetated surface
- I. Extremely hot burns avoided

N/A	YES	NO	SIG. RISK
47	86	2	0
43	90	2	0
66	66	3	0
32	101	2	0
34	100	1	1
74	50	11	0
37	97	1	0
53	78	4	0
90	45	0	0
	713	26	1

Section Total

96.48

Percent Compliance

8. Landings

- A. Location outside of SMZ
- B. Well-drained location
- C. Number and size minimized
- D. Sensitive areas respected
- E. Restored/stabilized

N/A	YES	NO	SIG. RISK
22	111	2	0
13	121	1	0
8	127	0	0
13	122	0	0
14	115	6	0

Section Total

Percent Compliance 98.51

596	9	0

NO

3

5

7

15

SIG. RISK

0

0

1

1

9. Wetlands (Wetlands BMPs are Mandatory Practices)

- A. Hydrology of site unaltered
- B. Roads, drainage structures applied properly
- C. Mandatory BMPs followed

Section Total

Percent Compliance

92.06

N/A

74

76

66

YES

58

54

62

174

10. Fireline Construction

- A. Fireline erosion controlled
- B. Majority of fireline constructed around slopes or grade of less than ten (10) percent
- C. Water bars, turnouts, and other water control structures properly installed
- D. Diversion ditches not constructed at the head of a drain
- E. Firelines not constructed down the slope of natural gully
- F. SMZs left between the fireline and streams
- G. Avoid constructing firelines into an SMZ

N/A	YES	NO	SIG. RISK
104	28	3	0
105	27	3	0
91	39	5	0
92	32	11	0
108	19	8	0
116	19	0	0
114	21	0	0
	185	30	0

Section Total

Percent Compliance

86.05

11. Follow Up Questions

- A. Was activity supervised by a professional Forester?
- B. Was Landowner familiar with BMP handbook?
- C. Was Logger familiar with BMPs?
- D. Were BMPs included in contract?
- E. Has Logger completed Logger educational training courses?
- F. Are recommendations planned for Landowner, if needed?

Statewide Compliance Percentage

N/A	YES	NO
73	58	4
74	42	19
66	67	2
93	41	1
85	50	0
68	62	5



Table 2: BMP 2024 Monitoring Sites by County

County	Survey Sites	County	Survey Sites	County	Survey Sites
Adams	1	Itawamba	4	Pike	2
Alcorn	0	Jackson	0	Pontotoc	0
Amite	2	Jasper	3	Prentiss	3
Attala	0	Jefferson Davis	1	Quitman	0
Benton	0	Jefferson	1	Rankin	3
Bolivar	0	Jones	2	Scott	0
Calhoun	2	Kemper	2	Sharkey	0
Carroll	2	Lafayette	0	Simpson	1
Chickasaw	0	Lamar	3	Smith	0
Choctaw	1	Lauderdale	0	Stone	4
Claiborne	1	Lawrence	3	Sunflower	0
Clarke	3	Leake	2	Tallahatchie	0
Clay	1	Lee	1	Tate	0
Coahoma	0	Leflore	0	Tippah	0
Copiah	3	Lincoln	3	Tishomingo	3
Covington	2	Lowndes	1	Tunica	0
DeSoto	2	Madison	6	Union	2
Forrest	2	Marion	0	Walthall	2
Franklin	3	Marshall	4	Warren	0
George	2	Monroe	2	Washington	0
Greene	2	Montgomery	1	Wayne	2
Grenada	2	Neshoba	4	Webster	4
Hancock	0	Newton	5	Wilkinson	0
Harrison	0	Noxubee	2	Winston	2
Hinds	6	Oktibbeha	3	Yalobusha	4
Holmes	3	Panola	6	Yazoo	0
Humphreys	0	Pearl River	2		
Issaquena	0	Perry	2	Total Plots	135

Table 3: Applicable BMPs Implemented By Category

BMP Category	Number of	Total Applicable	BMPs Implemented	
	Survey Sites	Practices	Number	Percent
Streamside Management Zones	91	1350	1282	96.48%
Stream Crossing	83	675	669	98.19%
Permanent Roads	111	1,485	1,396	92.49%
Skid Trails/Temporary Roads	124	675	612	89.90%
Site Preparation	103	1,215	1,189	96.48%
Landings	127	675	666	98.51%
Wetlands	67	405	390	92.06%
Fireline Construction	43	945	915	86.05%
State Totals		7,425	7,119	93.77%

Table 4: BMP Categories with Significant Risks to Water Quality

BMP Category	Number	Percent
Streamside Management Zones	1	1
Stream Crossing	0	0
Permanent Roads	2	1
Skid Trails/Temporary Roads	1	1
Site Preparation	1	1
Landings	0	0
Wetlands	1	1
Fireline Construction	0	0
State Totals	6	5%



Mississippi Forestry Commission 3139 Highway 468 West Pearl, Mississippi 39208 *mfc.ms.gov*

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