

Article

Evaluating Best Management Practice Efficacy Based on Seasonal Variability and Spatial Scales

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Abstract: Implementing best management practices (BMPs) has proven to be an efficient method for reducing non-point source (NPS) pollutants. Agricultural NPS pollution is considered to be a major contributor to water quality impairment. This study aims to assess the variation in hydrologic and water quality outputs at field and watershed scales when BMPs are implemented using modeling approaches. The Yazoo River Watershed (YRW) is the largest watershed basin in the state of Mississippi with approximately 50% agricultural land. Runoff generated from agricultural areas carries sediments and nutrients. The Merigold watershed (MW) is a sub-basin of the YRW and a field-scale watershed with most of the land use being agriculture. It is essential to quantify the streamflow, sediment, total nitrogen (TN), and total phosphorus (TP) when BMPs are implemented. BMPs such as vegetative filter strips (VFS) and cover crops (CC) were tested in this study. The Soil and Water Assessment Tool (SWAT) model was applied to quantify the watershed's hydrologic and water quality outputs. SWAT model accuracy assessment was performed by calibration and validation process using the Nash and Sutcliffe Efficiency Index (NSE). Model performance was satisfactory for monthly streamflow, with NSE values in the range of 0.62 to 0.81, and for daily sediments, TN, and TP load estimation, with NSE values of 0.21, 0.20, and 0.47, respectively. CC was planted after harvesting the main crop. Therefore, it is essential to quantify the seasonal reduction in pollutants. Water quality was improved after BMP implementation, and an overall decrease in streamflow, sediment, TN, and TP loads was observed for both MW and YRW during dry and wet seasons. Previous studies regarding seasonal assessments with CC implementation in the MW and YRW were limited. Therefore, the results from this study could be a unique addition to the scientific literature.

Keywords: hydrology; water quality; BMP; watershed; SWAT



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1. Introduction

According to a survey conducted by the United States Environment Protection Agency (US-EPA), more than 46% of surface water resources are designated as impaired due to high levels of nitrogen and phosphorus [1,2]. Agricultural runoff carrying sediments and mineral salts is one of the predominant contributing factors to water quality deterioration [3]. Water quality impairment could cause the loss of aquatic life due to hypoxia, harmful algal blooms (HABs), salinity increment in benthic zones, and recreational deprivation [4,5]. Implementing conservation strategies, also known as best management practices (BMPs) has proven effective in mitigating the non-point source (NPS) pollutants that are generated from agricultural runoff [6–8]. The impact of BMPs can vary seasonally due to humid

sub-tropical climatic conditions in the Yazoo River Watershed (YRW) and the increased precipitation experienced from November to March after harvesting the main crops [9]. Following the harvest of crops including soybean, corn, and cotton, about 50% of the watershed area lacks vegetative cover from November to March [10]. This could potentially contribute to erosion caused by runoff generated during rainfall events [11]. BMPs such as vegetative filter strips (VFSs) and cover crops (CCs) serve as effective measures to reduce erosion by trapping the sediments, intercepting raindrops, absorbing residual nutrients, and increasing soil porosity and organic content [12–14].

Hydrological and water quality assessments at watershed scales incorporate the investigation of land use effects beyond agriculture [15–18]. Consequently, a field-scale watershed, Merigold Watershed (MW), with agriculture as a major land use type was delineated within the YRW. Numerous hydrological models including the Soil and Water Assessment Tool (SWAT) have been applied to evaluate hydrology and water quality at watershed scales [7,19–30]. Hydrological model simulations could be beneficial in investigating seasonal variation in the efficiency of BMPs related to streamflow, sediment, nitrogen, and phosphorus [12,31–35].

Hydrological conditions during the wet season (November to March) and the dry season (April to October) could exhibit considerable variability within YRW [34]. The average annual precipitation received in the region was about 1300 mm, with 40% of the precipitation received throughout the growing season. The remaining 60% of the precipitation occurred from November to March, which is lost either by surface or sub-surface flow [36–39]. BMPs such as VFSs can trap sediments and nutrient loads that would otherwise be carried by runoff [12]. The CCs help dissipate the potential and kinetic energy of raindrops, thus avoiding splash erosion and improving soil fertility, organic content, aeration, porosity, and soil moisture, as well as minimizing erosion by bonding the soil particles at the root zone [40,41]. About 47% of total applied nitrogen as fertilizer is utilized by crops throughout the crop cycle, while the remaining 53% of nitrogen is subject to loss mechanism, including leaching into the soil and water [42]. Previous studies indicated that the implementation of CCs decreased mineral salts of nitrogen and phosphorus significantly [40,43–46]. The efficacy of BMPs in reducing water quality parameters may vary due to seasonal hydrological variations [47]. Therefore, it becomes necessary to quantify the seasonal effects of the conservative practices in streamflow, sediment, and nutrient reductions. A comparative analysis of seasonal variation in the efficacies of BMPs at field and watershed scales is limited for the MW and YRW and the novelty associated with this research lies in the quantification of the hydrologic and water quality outputs during pre-harvest (April to October) and post-harvest (November to March) periods. Henceforth, the key objectives of this research were to (i) assess field and watershed scale models' performance by calibrating and validating hydrologic and water quality parameters; and (ii) determine the variability in the efficacy of individual and a combination of BMPs pre- and post-harvest cycles of the main crop (e.g., corn, soybean, cotton, and rice).

2. Materials and Methods

2.1. Study Area

This study was conducted both at field (MW) and watershed (YRW) scales. The YRW with a drainage area of about 5 million ha covers about 41% of the Mississippi, making it the largest watershed of the state with heterogeneous land use conditions. The YRW lies within the Mississippi Alluvial Valley. Major land use types in the watershed are agriculture (47%) within the Mississippi Delta, forest (49%), and the rest (4%) including residential areas, reservoirs, and lakes primarily residing in the Bluff hill region. Major soil categories include Alligator, Dundee, Smithdale, Forestdale, Sharkey, and Dowling. These soil types belong to hydrologic soil groups C and D, which contribute to high runoff and low permeability.

A field-scale watershed (MW) assessed in this study is located within the Delta region. The MW watershed has a drainage area of about 160,000 ha with gentle slopes ranging from

1% to 3% gradient, making it suitable for agriculture. About 77% of the MW area consisted of farmlands, followed by wetlands (16%), residential areas (5%), and water bodies (2%). Predominant soil types found in the MW were Alligator, Dundee, Forestdale, Tunica, Sharkey, and Dowling with silty loamy texture and belonging to hydrologic soil groups C and D with poor infiltration and high erodibility. Figure 1 depicts the geographical location of the YRW and the MW including the locations of United States Geological Survey (USGS) monitoring stations and National Oceanographic, and Atmospheric Administration (NOAA) weather stations. Similar to other areas in the state of Mississippi, both MW and YRW watersheds have common pollutants of concern with sediments and nutrients (TN and TP).

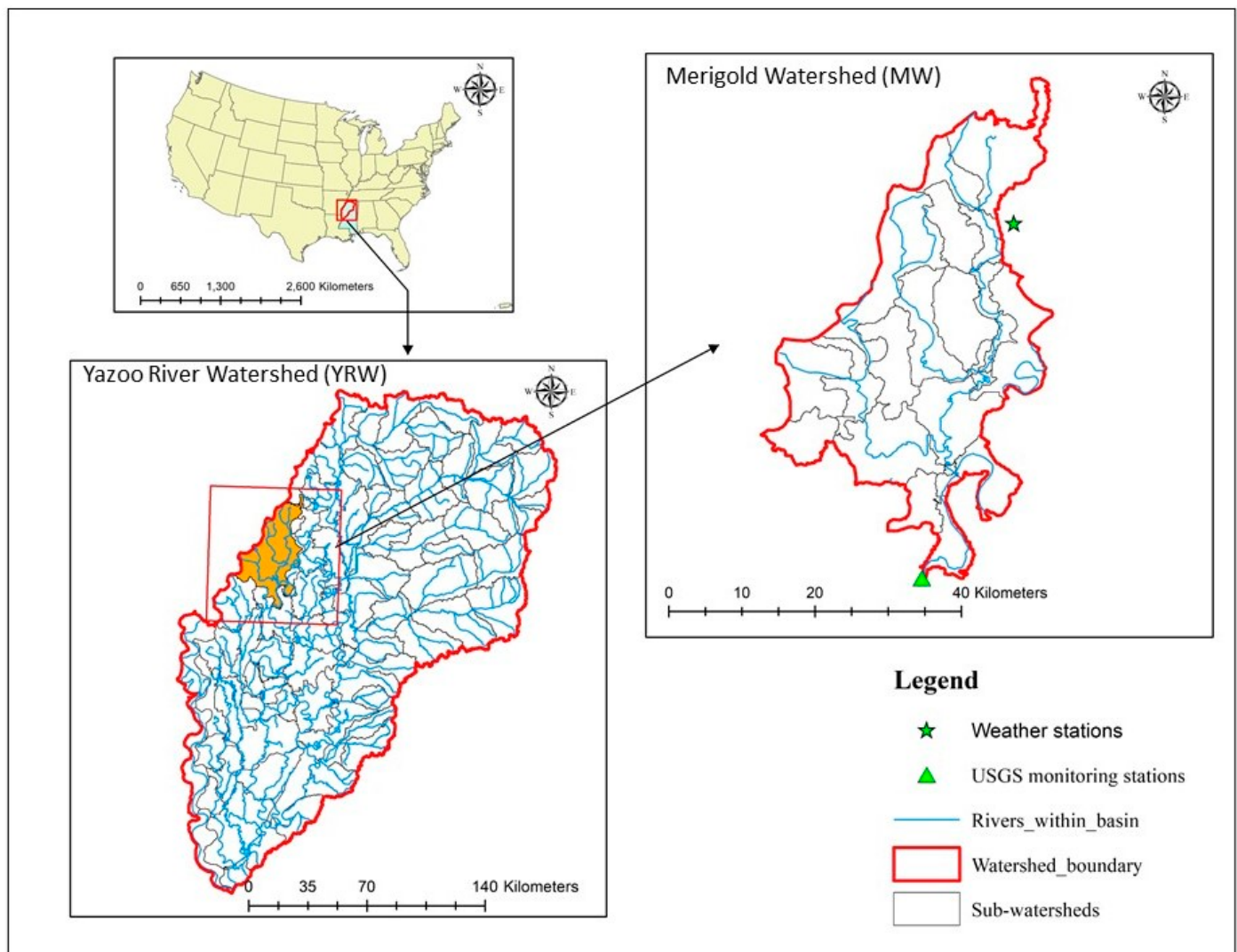


Figure 1. The geographical locations of the study area include Merigold and Yazoo River Watersheds showing USGS monitoring and weather stations.

2.2. Model Description and Data Inputs

The SWAT model is a hydrologic model that bases the analysis on GIS-based applications [20] and is developed and maintained by the United States Department of Agriculture, Agriculture Research Service (USDA-ARS) and Texas A&M University. The SWAT model was developed to perform the functions encompassed by a multitude of other models including the Routing Outputs to Outlet (ROTO) [48], Erosion Productivity Impact Calculator (EPIC) [49], Chemical Runoff and Erosion from Agricultural Management Sys-

tems (CREAMS) [50], Groundwater Loading Effect on Agricultural Management Systems (GLEAMS) [51], and Simulator for Water in Rural Basins (SWRRB) [52]. Outputs from the SWAT model could be interpreted at daily, monthly, and annual temporal resolutions. The SWAT model utilized the LiDAR-generated digital elevation model (DEM) data at a spatial resolution of 30 m [53] in this study to delineate watersheds. The YRW and MW were divided into 109 and 37 sub-watersheds, respectively, after successful delineation. In order to assess the seasonal variability of BMP impacts and the availability of data, the model was simulated from 2005 to 2015.

2.3. Data Inputs

Primary data inputs in the SWAT model included DEM data obtained from the USGS database [53] with 30 m $\times$ 30 m spatial resolution that was computationally favorable in watersheds with large drainage areas [54,55]. The land use data in the form of the Crop Land Data layer (CDL) was obtained from the United States Department of Agriculture (USDA) and the National Agricultural Statistical Service (NASS) [56]. The soil data were obtained from the Soil Survey Geographic Database (SSURGO) available at the Natural Resource Conservation Service—Web Soil Survey (NRCS-WSS) website [57]. Meteorological data including daily minimum and maximum temperature ($^{\circ}$ C), and daily precipitation (mm) from 2000 to 2019 for more than 20 spatially distributed weather stations were obtained from the NOAA website [58]. Agricultural management operations including planting, fertilizer application, pesticide application, irrigation inputs, and harvest for crops such as corn, cotton, soybean, and rice were scheduled based on crop variety trial reports obtained from the Mississippi Agricultural and Forestry Extension Service (MAFES) website [59].

2.4. Model Accuracy Assessment

The accuracy in model simulations was achieved through the calibration and validation of simulated results with the observed data. The model performance/accuracy was evaluated using statistical indicators including the Nash and Sutcliffe Efficiency Index (NSE) [60] and the Coefficient of Determination (R^2) [61]. The parameters sensitive to streamflow, sediment, total nitrogen (TN), and total phosphorus (TP) loads were adjusted to obtain an acceptable level of model performance. The sensitivity analysis for streamflow was conducted using the SWAT—Calibration Uncertainty Program (SWAT-CUP); this uses the Sequential Uncertainty fitting (SUFI-2) algorithm [62]. The SWAT-CUP is an auto-calibration tool that can alter one or more sensitive parameters associated with a specific hydrologic or water quality output within the given range of values. Observed monthly mean of streamflow was collected for 7 USGS monitoring spread across the YRW, including the USGS station at the MW outlet [63].

Sensitive parameters related to sediment and nutrient loads were adjusted using a manual calibration helper tool in the SWAT. Water quality data were collected by the grab-sampling method at the USGS monitoring station located at Merigold MS at bi-weekly intervals for 2 years, 2014 and 2015. Water samples were analyzed for the concentrations (mg/L) of Total Suspended Solids (TSS), TN, and TP following the standard laboratory protocol suggested by the US-EPA [64]. The water samples were transported in a temperature-controlled sampling container to the laboratories at the Department of Civil and Environmental Engineering and the Department of Forestry at Mississippi State University, Mississippi State, MS, for analysis. TSS, TN, and TP concentrations were then converted into loads (kg/ha) for calibration and validation for 2014 and 2015, respectively. Sensitive parameters adjusted for streamflow, sediment, TN, and TP were detailed in Venishetty and Parajuli, 2022 [65].

2.5. Seasonal Variation and Management Scenarios

Previous meteorological analysis performed for the humid-subtropical climate of Mississippi indicated that over 60% of rainfall occurs from November to April, making it a wet season [9,36–39]. This period falls during the post-harvest of the main/cash crop, thereby leading to rill erosion caused by agricultural runoff. Providing a vegetative solution

in terms of BMPs such as VFSs and CCs has resulted in a substantial decrease in streamflow and water quality parameters [66–69]. The BMPs were simulated as an individual practice as well as a combination of VFSs and CCs.

2.5.1. Vegetative Filter Strips (VFSs)

The VFSs comprise vegetated zones that are naturally grown or monitored small bushes and grasses, typically located adjacent to surface water sources [70]. The VFSs were implemented as edge-of-field practice, commonly perpendicular to the slope of the field. The VFSs control erosion and pollution by trapping sediments and nutrients from the runoff. The settling of larger soil and organic particles aided by VFSs additionally serves to decelerate surface runoff. Due to the drainage characteristics of the Mississippi Alluvial Valley, VFSs would need to be implemented within the field to adequately intercept runoff prior to field drainage via culverts to ditch networks. In SWAT, the VFS width of 0 m was regarded as the default setting. The filter strip trapping efficiency was calculated using Equation (1) [71]. The model features a filter width (FILTERW) function that has been modified to simulate VFSs in the YRW [72]. According to earlier studies carried out globally, a VFS trapping efficacy of roughly 90% was taken into account during implementation at the hydrologic response unit (HRU) levels [73]. Default values were used for management operations associated with VFS simulation in the model such as VFS_RATIO (the ratio of field area to filter strip area), VFS_CON (where 10% of the VFS area receives the highest concentration of HRU drainage), and VFS_CH (which represents channelized flow concentrated to 10% of the VFS area) [72].

$$\text{Trapping Efficiency} = 0.367 \times (\text{Filter strip width})^{0.2967} \quad (1)$$

2.5.2. Cover Crops (CCs)

The CCs are planted after harvesting the main crop as a vegetative cover for the bare ground. CCs are beneficial in multiple ways such as reducing erosion caused due to wind and water, regulating soil organic content, decreasing weed and pest population, reducing soil compaction, and absorbing residual nutrients [74]. The vegetation in the field dissipates the kinetic and potential raindrop energies through interception, reducing splash erosion [75]. Cereal Rye (*Secale cereale*), winter wheat (*Triticum aestivum* L.), and winter barley (*Hordeum vulgare* L.) were used as CCs in this study [76].

3. Results

3.1. Model Accuracy Assessment

Correlating observed and simulated values allowed for the evaluation of the SWAT model's performance. The sensitive factors that affect sediment, streamflow, TN, and TP loads must be changed as part of the calibration and validation process. The calibrated YRW model [65] was used to develop field-scale MW. The field-scale model was calibrated monthly using the data from the USGS streamflow monitoring station at Merigold, MS, in the Big Sunflower River, between 2007 and 2010 and validated between 2011 and 2014. Figure 2 illustrates that the model performance results for monthly streamflow simulations were good, with R^2 values ranging from 0.73 to 0.75 and NSE values ranging from 0.70 to 0.75.

Likewise, daily simulated results in 2014 and 2015, respectively, were used to calibrate and validate the model in order to attain the desired level of accuracy for water quality outputs such as sediment, TN, and TP loads. A manual calibration approach was used to get the values for statistical metrics, and individual iterations were used to quantify the sensitivity to a particular parameter. More than 200 iterations were performed to achieve the final R^2 and NSE values. With NSE values for sediments and nutrients ranging from 0.14 to 0.42 [77], the model's performance for daily simulations was found to be within an acceptable range. Table 1 provides more information on these results. Despite the extreme weather events in the area during the desired simulation period and the relatively

high values of sediments, TN, and TP in the samples, the model calibration and validation performances demonstrated satisfactory results and were within the range of earlier studies conducted in watersheds of Wisconsin, Mississippi, Indiana, Texas, and European countries [24,78–82].

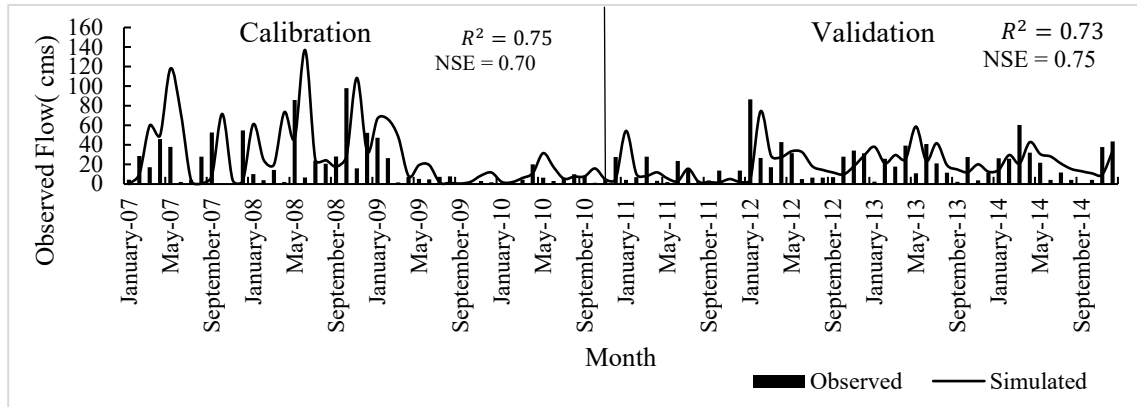


Figure 2. Model accuracy assessment through calibration and validation of seamless monthly streamflow from 2007 to 2014 at the USGS monitoring station (Station No: 7288280) in the Big Sunflower River at Merigold, MS.

Table 1. Model performance during daily calibration and validation at the USGS monitoring station in the Big Sunflower River at Merigold, MS.

Process	Sediment		TN		TP	
	R ²	NSE	R ²	NSE	R ²	NSE
Calibration (2014)	0.20	0.17	0.15	0.18	0.30	0.35
Validation (2015)	0.23	0.21	0.14	0.20	0.47	0.42

3.2. Seasonal Variation in the Efficacy of BMPs

Between the dry and wet seasons of the year, a catchment's hydrologic features change. Similarly, significant alterations in the movement of sediment and nutrients may occur. The results from BMP scenarios were evaluated between the primary farming season, which runs from April to October, and the post-harvest season, which runs from November to March. The wettest time of the year fell during the post-harvest season [9]. The implementation of VFSs, CCs, and a combination of VFSs and CCs were simulated as management scenarios for both the wet and dry seasons of the watershed. For MW and YRW in the case of VFSs, which has a width of 20 m, a substantial decrease in sediment and nutrient loads was seen during the wet season. Research from earlier studies suggests that a BMP's effectiveness was higher in the field scale compared to the watershed scale implementation [34,46,83–85]. Sediment, TN, and TP loads for a 20 m VFS width decreased overall from November to March in the MW by approximately 12%, 77%, and 78%, respectively. Similarly, percentage decreases in the YRW were approximately 10%, 49%, and 41%, respectively. As for CCs, throughout the post-harvest period, there was a significant decline in TN and TP loads; Table 2 provides more information. In the case of the wet and dry seasons, respectively, Figures 3 and 4 depict the comparative evaluation of BMP efficacies at the field and watershed scales.

Table 2. Overall percentage reduction in hydrologic and water quality outputs during the post-harvest period (wet season) in the Merigold Watershed and the Yazoo River Watershed.

November to March (Wet Season)	Best Management Practices (BMPs)	Percent Reduction			
		Streamflow	Sediment	TN	TP
Merigold Watershed	VFS 20 m	0.05	12.00	76.70	77.70
	CC_Cereal Rye	17.53	24.10	25.84	40.45
	CC_WBarley	17.00	23.34	28.43	42.21
	CC_WWheat	15.00	20.56	31.66	42.77
	VFS + Cereal Rye	17.54	28.72	68.46	75.50
	VFS + WBarley	14.19	27.05	71.67	76.74
	VFS + WWheat	15.00	27.25	71.41	75.63
Yazoo River Watershed	VFS 20 m	0.00	10.13	48.75	40.79
	CC_Cereal Rye	4.79	2.04	19.94	14.29
	CC_WBarley	4.57	1.86	18.47	16.34
	CC_WWheat	3.51	7.35	35.53	17.05
	VFS + Cereal Rye	4.91	13.40	54.66	42.00
	VFS + WBarley	4.79	13.36	55.20	42.15
	VFS + WWheat	3.17	12.54	56.65	42.32

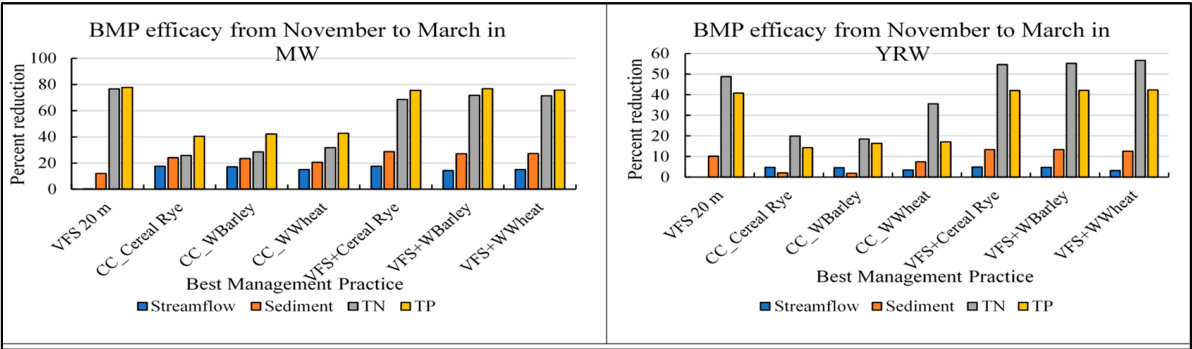


Figure 3. Efficacy of best management practices during the post-harvest period (wet season, November to March) for the Merigold Watershed (Right) and the Yazoo River Watershed (Left).

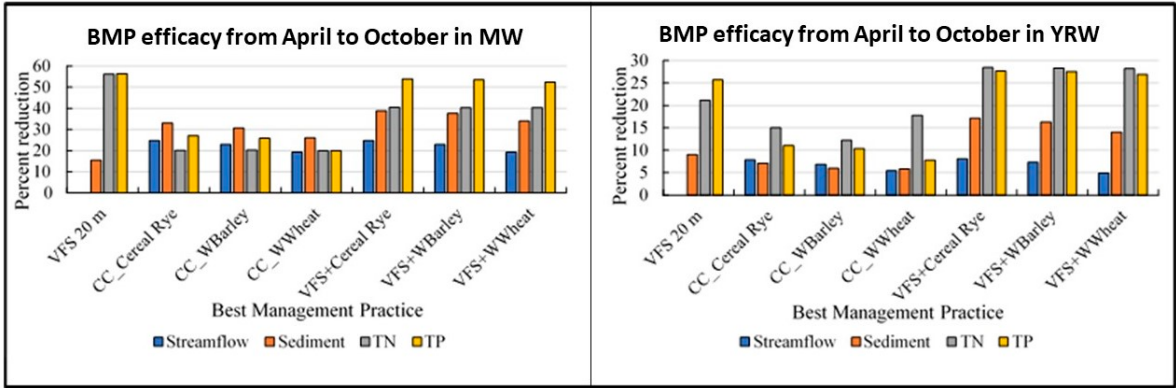


Figure 4. Efficacy of best management practices during the growing season (dry season, April to October) for the Merigold Watershed (Right) and the Yazoo River Watershed (Left).

Despite being removed before the main crop is planted, Table 3 shows that the presence of CCs in the previous season had a major impact on the streamflow, sediment, and nutrient loads from April to October. The main crop offered vegetative cover to the soil throughout the crop growing season which was considerably drier than post-harvest season.

Table 3. Overall percentage reduction in hydrologic and water quality outputs during the main crop growing season (dry season) in the Merigold Watershed and the Yazoo River Watershed.

April to October (Dry Season)	Best Management Practices (BMPs)	Percent Reduction			
		Streamflow	Sediment	TN	TP
Merigold Watershed	VFS 20 m	0.12	15.50	56.10	56.30
	CC_Cereal Rye	24.64	33.00	20.09	27.00
	CC_WBarley	22.84	30.61	20.24	25.75
	CC_WWheat	19.19	26.00	19.82	20.01
	VFS + Cereal Rye	24.64	38.88	40.42	53.83
	VFS + WBarley	22.84	37.64	40.20	53.40
	VFS + WWheat	19.19	33.89	40.30	52.35
Yazoo River Watershed	VFS 20 m	0.00	9.02	21.16	25.72
	CC_Cereal Rye	7.84	7.11	15.00	11.00
	CC_WBarley	6.84	5.97	12.26	10.39
	CC_WWheat	5.42	5.84	17.77	7.73
	VFS + Cereal Rye	8.02	17.10	28.47	27.64
	VFS + WBarley	7.29	16.34	28.31	27.54
	VFS + WWheat	4.88	14.04	28.22	26.93

4. Discussion

Model performance for sediment, TN, and TP loads was deemed appropriate and acceptable, while assessments of the model's accuracy revealed good performance for streamflow. Previous literature was used to validate the values of R^2 and NSE [24,78–82]. In total, seven different management scenarios were simulated during the post-harvest season (wet season) from November to March and during the growing season (dry season) from April to October. Sediment and nutrient loads for both MW and YRW were significantly reduced from November to March when VFSs were simulated with a 20 m width as edge-of-field practice [86]. Sediment, TN, and TP load decreased on average by 12%, 77%, and 78% for MW and 10%, 49%, and 41% for YRW, respectively. The estimates of nutrient and sediment reductions with the implementation of VFSs were optimistic, given that observed nutrient reductions associated with VFS implementation are limited in the region and variability in reduction efficiencies is observed with a wide range of design specifications. Future research on VFS efficacy in the Mississippi Alluvial Valley is warranted due to the observed variety in the literature and the general absence of studies on the subject. Similarly, during the wet season, there was a greater decrease in TN and TP loads when CCs and VFSs were combined. Reductions in TP and TN, when CCs and the combination scenarios were applied, ranged from 14% to 56% for the YRW and from 25% to 75% for MW. These results are in contrast with those of Badon et al. (2022), who reported that during the first two years of CC deployment, CCs had no effect on discharge or the movement of nutrients and sediments. Despite the fact that CCs were terminated before the main crop was planted, the presence of CC residue had an impact on streamflow, sediment, and nutrient loads from April to October, as described in Table 3. The termination of CCs was mainly using herbicide spray and tillage before the main crop was planted. CC residue could also help in improving soil moisture, infiltration, and soil hydraulic conductivity [87–92]. The results from this study were consistent with the previous literature [12,14,40,41,45,66–69,75,93–95].

5. Conclusions

The results of this investigation demonstrate that seasonal variability significantly affects BMP efficacies. It was found that during the post-harvest season, when the watershed receives the most precipitation, the VFS was the most effective BMP. Likewise, CCs were more effective in lowering TN and TP loading during the post-harvest (wet season) period. During the crop-growing season (dry season), the effect of CCs was substantial in minimizing the sediments, nutrients, and runoff, as they may have improved infiltration, hydraulic conductivity, and other factors of the soil. As a result, using CCs as a BMP would help with post-harvest residual nutrient uptake. Additionally, CCs led to reducing sediment loads and streamflow. Quantifying the efficacies of BMPs based on modeling seasonal variability has never been performed at field and watershed scales in the region. Henceforth, this could be a novel addition to understanding the relationship between the reduction capabilities of BMPs, seasonal variation, and the effect on hydrologic and water quality outputs. This study could be a valuable addition to scientific literature, farmers, and other stakeholders. The BMP efficacies studied in this paper can be useful in adapting watershed stakeholders based on seasonal effectiveness.

Author Contributions: V.V. and D.N. developed models, analyzed model outputs, and drafted the manuscript. P.B.P. developed the conceptual framework of the research, obtained financial research support, and reviewed the manuscript. F.T., B.B. and V.G.G. helped with the revision of the manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: The authors declare no conflicts of interest.

References

1. US-EPA. Water Conservation at EPA | US EPA. 2023. Available online: <https://www.epa.gov/greeningepa/water-conservation-epa> (accessed on 2 May 2023).
2. US EPA. National Water Quality Inventory: Report to Congress, Washington DC. 2017. Available online: <https://www.epa.gov/national-aquatic-resource-surveys> (accessed on 2 May 2023).
3. Lacher, I.L.; Ahmadisharaf, E.; Fergus, C.; Akre, T.; Mcshea, W.J.; Benham, B.L.; Kline, K.S. Scale-dependent impacts of urban and agricultural land use on nutrients, sediment, and runoff. *Sci. Total Environ.* **2019**, *652*, 611–622. [CrossRef] [PubMed]
4. Dash, P.; Silwal, S.; Ikenga, J.O.; Pinckney, J.L.; Arslan, Z.; Lizotte, R.E. Water Quality of Four Major Lakes in Mississippi, USA: Impacts on Human and Aquatic Ecosystem Health. *Water* **2015**, *7*, 4999–5030. [CrossRef]
5. Shaughnessy, A.R.; Sloan, J.J.; Corcoran, M.J.; Hasenmueller, E.A. Sediments in Agricultural Reservoirs Act as Sinks and Sources for Nutrients over Various Timescales. *Water Resour. Res.* **2019**, *55*, 5985–6000. [CrossRef]
6. Diebel, M.W.; Maxted, J.T.; Nowak, P.J.; Zanden, M.J.V. Landscape Planning for Agricultural Nonpoint Source Pollution Reduction I: A Geographical Allocation Framework. *Environ. Manag.* **2008**, *42*, 789–802. [CrossRef] [PubMed]
7. Bhattarai, S.; Parajuli, P.B. Best Management Practices Affect Water Quality in Coastal Watersheds. *Sustainability* **2023**, *15*, 4045. [CrossRef]
8. Nepal, D.; Parajuli, P.B. Assessment of Best Management Practices on Hydrology and Sediment Yield at Watershed Scale in Mississippi Using SWAT. *Agriculture* **2022**, *12*, 518. [CrossRef]
9. Feng, G.; Cobb, S.; Abdo, Z.; Fisher, D.K.; Ouyang, Y.; Adeli, A.; Jenkins, J.N. Trend analysis and forecast of precipitation, reference evapotranspiration, and rainfall deficit in the blackland prairie of eastern Mississippi. *J. Appl. Meteorol. Climatol.* **2016**, *55*, 1425–1439. [CrossRef]
10. USDA-NASS. United States Department of Agriculture National Agricultural Statistics Service Mississippi Crop Production, Jackson, MS. 2022. Available online: <https://www.nass.usda.gov/ms> (accessed on 2 May 2023).
11. Nearing, M.A.; Yin, S.Q.; Borrelli, P.; Polyakov, V.O. Rainfall erosivity: An historical review. *CATENA* **2017**, *157*, 357–362. [CrossRef]
12. Vanrobbaeys, J.A.; Owens, P.N.; Lobb, D.A.; Kieta, K.A.; Campbell, J.M. Seasonal Efficacy of Vegetated Filter Strips for Phosphorus Reduction in Surface Runoff. *J. Environ. Qual.* **2019**, *48*, 880–888. [CrossRef]
13. Roley, S.S.; Tank, J.L.; Tyndall, J.C.; Witter, J.D. How cost-effective are cover crops, wetlands, and two-stage ditches for nitrogen removal in the Mississippi River Basin? *Water Resour. Econ.* **2016**, *15*, 43–56. [CrossRef]

14. Elçi, A. Evaluation of Nutrient Retention in Vegetated Filter Strips Using the SWAT Model. In Proceedings of the WA 2nd Regional Symposium on Water, Wastewater and Environment, Çesme-Izmir, Turkey, 22–24 March 2017. Available online: <https://www.researchgate.net/publication/315716174> (accessed on 2 May 2023).
15. Her, Y.; Chaubey, I.; Frankenberger, J.; Smith, D. Effect of conservation practices implemented by USDA programs at field and watershed scales. *J. Soil Water Conserv.* **2016**, *71*, 249–266. [\[CrossRef\]](#)
16. Karki, R.; Srivastava, P.; Bosch, D.D.; Kalin, L.; Lamba, J.; Strickland, T.C. Multi-Variable Sensitivity Analysis, Calibration, and Validation of a Field-Scale SWAT Model: Building Stakeholder Trust in Hydrologic and Water Quality Modeling. *Trans. ASABE* **2020**, *63*, 523–539. [\[CrossRef\]](#)
17. Merriman, K.R.; Daggupati, P.; Srinivasan, R.; Toussant, C.; Russell, A.M.; Hayhurst, B. Assessing the impact of site-specific BMPs using a spatially explicit, field-scale SWAT model with edge-of-field and tile hydrology and water-quality data in the Eagle Creek Watershed, Ohio. *Water* **2018**, *10*, 1299. [\[CrossRef\]](#)
18. Risal, A.; Parajuli, P.B. Evaluation of the Impact of Best Management Practices on Streamflow, Sediment and Nutrient Yield at Field and Watershed Scales. *Water Resour. Manag.* **2022**, *36*, 1093–1105. [\[CrossRef\]](#)
19. Guse, B.; Kail, J.; Radinger, J.; Schröder, M.; Kiesel, J.; Hering, D.; Wolter, C.; Fohrer, N. Eco-hydrologic model cascades: Simulating land use and climate change impacts on hydrology, hydraulics and habitats for fish and macroinvertebrates. *Sci. Total Environ.* **2015**, *533*, 542–556. [\[CrossRef\]](#) [\[PubMed\]](#)
20. Arnold, J.G.; Srinivasan, R.; Muttiah, R.S.; Williams, J.R. Large area hydrologic modeling and assessment part I: Model development. *J. Am. Water Resour. Assoc.* **1998**, *34*, 73–89. [\[CrossRef\]](#)
21. Abbaspour, K.C.; Vaghefi, S.A.; Srinivasan, R. A guideline for successful calibration and uncertainty analysis for soil and water assessment: A review of papers from the 2016 international SWAT conference. *Water* **2017**, *10*, 6. [\[CrossRef\]](#)
22. Addab, H.; Bailey, R.T. Simulating the effect of subsurface tile drainage on watershed salinity using SWAT. *Agric. Water Manag.* **2022**, *262*, 107431. [\[CrossRef\]](#)
23. Bacu, V.; Mihon, D.; Rodila, D.; Stefanut, T.; Gorgan, D. gSWAT platform for grid based hydrological model calibration and execution. In Proceedings of the 2011 10th International Symposium on Parallel and Distributed Computing, Cluj-Napoca, Romania, 6–8 July 2011; pp. 288–291. [\[CrossRef\]](#)
24. Dakhalla, A.O.; Parajuli, P.B. Assessing model parameters sensitivity and uncertainty of streamflow, sediment, and nutrient transport using SWAT. *Inf. Process. Agric.* **2019**, *6*, 61–72. [\[CrossRef\]](#)
25. Maski, D.; Mankin, K.R.; Anand, S.; Janssen, K.A.; Pierzynski, G.M. Calibration and Validation of SWAT for Field-Scale Sediment-Yield Prediction. In Proceedings of the Annual International Meeting, Portland, Oregon, 9–12 July 2006; American Society of Agricultural and Biological Engineers: St. Joseph, MI, USA, 2006. [\[CrossRef\]](#)
26. Du, J.; Rui, H.; Zuo, T.; Li, Q.; Zheng, D.; Chen, A.; Xu, Y.; Xu, C.Y. Hydrological Simulation by SWAT Model with Fixed and Varied Parameterization Approaches Under Land Use Change. *Water Resour. Manag.* **2013**, *27*, 2823–2838. [\[CrossRef\]](#)
27. Ouyang, Y.; Feng, G.; Parajuli, P.; Leininger, T.; Wan, Y.; Jenkins, J.N. Assessment of Surface Water Quality in the Big Sunflower River Watershed of Mississippi Delta Using Nonparametric Analysis. *Water. Air. Soil Pollut.* **2018**, *229*, 373. [\[CrossRef\]](#) [\[PubMed\]](#)
28. Sinnathamby, S.; Douglas-Mankin, K.R.; Craigie, C. Field-scale calibration of crop-yield parameters in the Soil and Water Assessment Tool (SWAT). *Agric. Water Manag.* **2017**, *180*, 61–69. [\[CrossRef\]](#)
29. AgnKowalczyk, W.; Grabowska-Polanowska, B.; Garbowski, T.; Kopacz, M.; Lach, S.; Mazur, R. A multicriteria approach to different land use scenarios in the Western Carpathians with the SWAT model. *J. Water Land Dev.* **2023**, *57*, 130–139. [\[CrossRef\]](#)
30. Abdullaeva, B.S. Integrating advanced approaches for climate change impact assessment on water resources in arid regions. *J. Water Land Dev.* **2024**, *60*, 149–156. [\[CrossRef\]](#)
31. Johnson, T.; Butcher, J.; Deb, D.; Faizullahoy, M.; Hummel, P.; Kittle, J.; McGinnis, S.; Mearns, L.O.; Nover, D.; Parker, A.; et al. Modeling Streamflow and Water Quality Sensitivity to Climate Change and Urban Development in 20 U.S. Watersheds. *J. Am. Water Resour. Assoc.* **2015**, *51*, 1321–1341. [\[CrossRef\]](#) [\[PubMed\]](#)
32. Paul, M.; Rajib, M.A.; Ahiablame, L. Spatial and Temporal Evaluation of Hydrological Response to Climate and Land Use Change in Three South Dakota Watersheds. *J. Am. Water Resour. Assoc.* **2017**, *53*, 69–88. [\[CrossRef\]](#)
33. Shrestha, S.; Bhatta, B.; Shrestha, M.; Shrestha, P.K. Integrated assessment of the climate and landuse change impact on hydrology and water quality in the Songkhram River Basin, Thailand. *Sci. Total Environ.* **2018**, *643*, 1610–1622. [\[CrossRef\]](#) [\[PubMed\]](#)
34. Risal, A.; Parajuli, P.B. Quantification and simulation of nutrient sources at watershed scale in Mississippi. *Sci. Total Environ.* **2019**, *670*, 633–643. [\[CrossRef\]](#)
35. Neupane, R.P.; Kumar, S. Estimating the effects of potential climate and land use changes on hydrologic processes of a large agriculture dominated watershed. *J. Hydrol.* **2015**, *529*, 418–429. [\[CrossRef\]](#)
36. NOAA. Statewide Rankings | Climate at a Glance | National Centers for Environmental Information (NCEI). 2023. Available online: <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/rankings/22/pcp/201912> (accessed on 3 May 2023).
37. Zhang, B.; Feng, G.; Read, J.J.; Kong, X.; Ouyang, Y.; Adeli, A.; Jenkins, J.N. Simulating soybean productivity under rainfed conditions for major soil types using APEX model in East Central Mississippi. *Agric. Water Manag.* **2016**, *177*, 379–391. [\[CrossRef\]](#)
38. Feng, G.; Ouyang, Y.; Adeli, A.; Read, J.; Jenkins, J. Rainwater Deficit and Irrigation Demand for Row Crops in Mississippi Blackland Prairie. *Soil Sci. Soc. Am. J.* **2018**, *82*, 423–435. [\[CrossRef\]](#)

39. Anapalli, S.S.; Reddy, K.N.; Jagadamma, S. Conservation tillage impacts and adaptations in irrigated corn production in a humid climate. *Agron. J.* **2018**, *110*, 2673–2686. [\[CrossRef\]](#)
40. Blanco-Canqui, H.; Ruis, S.J.; Holman, J.D.; Creech, C.F.; Obour, A.K.; Blanco-Canqui, C.H. Can cover crops improve soil ecosystem services in water-limited environments? A review. *Soil Sci. Soc. Am. J.* **2021**, *86*, 1–18. [\[CrossRef\]](#)
41. Abdalla, M.; Hastings, A.; Cheng, K.; Yue, Q.; Chadwick, D.; Espenberg, M.; Truu, J.; Rees, R.M.; Smith, P. A critical review of the impacts of cover crops on nitrogen leaching, net greenhouse gas balance and crop productivity. *Glob. Chang. Biol.* **2019**, *25*, 2530–2543. [\[CrossRef\]](#) [\[PubMed\]](#)
42. Lassaletta, L.; Billen, G.; Grizzetti, B.; Anglade, J.; Garnier, J. 50 year trends in nitrogen use efficiency of world cropping systems: The relationship between yield and nitrogen input to cropland. *Environ. Res. Lett.* **2014**, *9*, 105011. [\[CrossRef\]](#)
43. Badon, T.; Czarnecki, J.M.P.; Baker, B.H.; Spencer, D.; Hill, M.J.; Lucore, A.E.; Krutz, L.J. Transitioning from conventional to cover crop systems with minimum tillage does not alter nutrient loading. *J. Environ. Qual.* **2022**, *51*, 966–977. [\[CrossRef\]](#) [\[PubMed\]](#)
44. Baker, B.; Omer, A.; Oldham, L.; Burger, L.M.D. Natural Resources Conservation in Agriculture, Mississippi State University Extension, Mississippi State, MS. 2017. Available online: <https://www.researchgate.net/publication/318363028> (accessed on 3 May 2023).
45. Firth, A.G.; Brooks, J.P.; Locke, M.A.; Morin, D.J.; Brown, A.; Baker, B.H. Dynamics of Soil Organic Carbon and CO₂ Flux under Cover Crop and No-Till Management in Soybean Cropping Systems of the Mid-South (USA). *Environments* **2022**, *9*, 109. [\[CrossRef\]](#)
46. Venishetty, V.; Parajuli, P.B.; Nepal, D. Spatial Variability of Best Management Practices Effectiveness on Water Quality within the Yazoo River Watershed. *Hydrology* **2023**, *10*, 92. [\[CrossRef\]](#)
47. Liu, Y.; Engel, B.A.; Flanagan, D.C.; Gitau, M.W.; McMillan, S.K.; Chaubey, I.; Singh, S. Modeling framework for representing long-term effectiveness of best management practices in addressing hydrology and water quality problems: Framework development and demonstration using a Bayesian method. *J. Hydrol.* **2018**, *560*, 530–545. [\[CrossRef\]](#)
48. Arnold, J.G.; Williams, J.R.; Maidment, D.R. Continuous-Time Water and Sediment-Routing Model for Large Basins. *J. Hydraul. Eng.* **1995**, *121*, 171–183. [\[CrossRef\]](#)
49. Williams, J.R.; Berndt, H.D. Sediment Yield Prediction Based on Watershed Hydrology. *Trans. ASAE* **1977**, *20*, 1100–1104. [\[CrossRef\]](#)
50. Knisel, W.; Nicks, A. CREAMS—A Field Scale Model for Chemicals, Runoff, and Erosion from Agricultural Management Systems, Washington DC. 1980. Available online: <https://www.google.com/books/edition/CREAMS/AwcUAAAAAYAAJ?hl=en&gbpv=1&dq=CREAMS:+a+field+scale+model+for+chemicals,+runoff+and+erosion+from+agricultural+management+systems,+USDA+SEA+Conservation,+Research+Report&pg=PA1&printsec=frontcover> (accessed on 16 December 2022).
51. Leonard, R.A.; Knisel, W.G.; Still, D.A. GLEAMS: Groundwater Loading Effects of Agricultural Management Systems. *Trans. ASAE* **1987**, *30*, 1403–1418. [\[CrossRef\]](#)
52. De Mello, C.R.; Norton, L.D.; Pinto, L.C.; Beskow, S.; Curi, N. Agricultural watershed modeling: A review for hydrology and soil erosion processes. *Ciência Agrotecnologia* **2016**, *40*, 7–25. [\[CrossRef\]](#)
53. USGS. Digital Elevation Models. 2020. Available online: <https://apps.nationalmap.gov/downloader/#productSearch> (accessed on 27 August 2020).
54. Pignotti, G.; Rathjens, H.; Cibin, R.; Chaubey, I.; Crawford, M. Comparative Analysis of HRU and Grid-Based SWAT Models. *Water* **2017**, *9*, 272. [\[CrossRef\]](#)
55. Sliwiński, D.; Konieczna, A.; Roman, K. Geostatistical Resampling of LiDAR-Derived DEM in Wide Resolution Range for Modelling in SWAT: A Case Study of Zgłowiączka River (Poland). *Remote Sens.* **2022**, *14*, 1281. [\[CrossRef\]](#)
56. USDA-NASS. USDA—National Agricultural Statistics Service—Research & Science—Cropland Data Layer—Metadata. 2009. Available online: https://www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php (accessed on 25 April 2023).
57. NRCS. Web Soil Survey (WSS) SSURGO Database. 2012. Available online: <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx> (accessed on 10 September 2020).
58. NOAA. National Oceanic and Atmospheric Administration (NOAA) Climate Data Online (CDO) | National Climatic Data Center (NCDC). 2019. Available online: <https://www.ncdc.noaa.gov/cdo-web/search> (accessed on 31 August 2020).
59. MAFES. Mississippi Agricultural and Forestry Experiment Station—Variety Trials. 2006. Available online: <https://www.mafes.msstate.edu/variety-trials/> (accessed on 31 August 2020).
60. JNash, E.; Sutcliffe, J.V. River flow forecasting through conceptual models part I—A discussion of principles. *J. Hydrol.* **1970**, *10*, 282–290. [\[CrossRef\]](#)
61. Legates, D.R.; McCabe, G.J. Evaluating the use of “goodness-of-fit” measures in hydrologic and hydroclimatic model validation. *Water Resour. Res.* **1999**, *35*, 233–241. [\[CrossRef\]](#)
62. Abbaspour, K.C.; Johnson, C.A.; van Genuchten, M.T. Estimating Uncertain Flow and Transport Parameters Using a Sequential Uncertainty Fitting Procedure. *Vadose Zone J.* **2004**, *3*, 1340–1352. [\[CrossRef\]](#)
63. USGS. USGS Daily, Monthly and Yearly Data for Mississippi: Stage and Streamflow. 2002. Available online: https://waterdata.usgs.gov/ms/nwis/current/?type=dailystagedischarge&group_key=basin_cd#Equipment_malfunction (accessed on 10 August 2020).
64. US-EPA. Guidance for Quality Assurance Project Plans for Modeling EPA QA/G-5M, Washington, DC. 2002. Available online: www.epa.gov/quality (accessed on 22 March 2023).

65. Venishetty, V.; Parajuli, P.B. Assessment of BMPs by Estimating Hydrologic and Water Quality Outputs Using SWAT in Yazoo River Watershed. *Agriculture* **2022**, *12*, 477. [\[CrossRef\]](#)
66. Maharjan, G.R.; Ruidisch, M.; Shope, C.L.; Choi, K.; Huwe, B.; Kim, S.J.; Tenhunen, J.; Arnhold, S. Assessing the effectiveness of split fertilization and cover crop cultivation in order to conserve soil and water resources and improve crop productivity. *Agric. Water Manag.* **2016**, *163*, 305–318. [\[CrossRef\]](#)
67. Berkowitz, J.F.; Schlea, D.A.; VanZomer, C.M.; Boles, C.M.W. Coupling watershed modeling, public engagement, and soil analysis improves decision making for targeting P retention wetland locations. *J. Great Lakes Res.* **2020**, *46*, 1331–1339. [\[CrossRef\]](#)
68. Teshager, A.D.; Gassman, P.W.; Secchi, S.; Schoof, J.T. Simulation of targeted pollutant-mitigation-strategies to reduce nitrate and sediment hotspots in agricultural watershed. *Sci. Total Environ.* **2017**, *607*–*608*, 1188–1200. [\[CrossRef\]](#)
69. Getahun, E.; Keefer, L.L. Assessing the Effectiveness of Winter Cover Crops for Controlling Agricultural Nutrient Losses. *J. Am. Water Resour. Assoc.* **2023**, *59*, 510–522. [\[CrossRef\]](#)
70. NRCS. United States Department of Agriculture—Natural Resources Conservation Service (USDA-NRCS) Filter Strip | NRCS. 2016. Available online: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=nrcs142p2_044352 (accessed on 5 December 2021).
71. Neitsch, S.L.; Arnold, J.G.; Kiniry, J.R.; Williams, J.R. *Soil and Water Assessment Tool Theoretical Documentation Version 2009*; College of Agriculture and Life Sciences—Texas A&M University: College Station, TX, USA, 2011.
72. Arnold, J.G.; Moriasi, D.N.; Gassman, P.W.; Abbaspour, K.C.; White, M.J.; Srinivasan, R.; Santhi, C.; Harmel, R.D.; Van Griensven, A.; Van Liew, M.W.; et al. SWAT: Model use, Calibration, and Validation. *Trans. ASABE* **2012**, *55*, 1491–1508. [\[CrossRef\]](#)
73. Luo, Y. Modeling the Mitigating Effects of Conservation Practices for Pyrethroid Uses in Agricultural Areas of California. *ACS Symp. Ser.* **2019**, *1308*, 275–289. [\[CrossRef\]](#)
74. USDA-NRCS. United States Department of Agriculture—Natural Resources Conservation Service (USDA-NRCS)—Cover Crop | NRCS, Washington DC. 2014. Available online: https://www.nrcs.usda.gov/sites/default/files/2022-09/Cover_Crop_34_0_CPS.pdf (accessed on 20 December 2020).
75. LaRose, J.; Myers, R. Cover Crops: A Cost-Effective Tool for Controlling Erosion, Columbia, MO. 2021. Available online: <https://cra.missouri.edu/wp-content/uploads/2021/09/Cover-crops-controlling-erosion.pdf> (accessed on 3 May 2023).
76. Burdine, B. *Cover Crops: Benefits and Limitations*; Mississippi State University Extension Service: Verona, MS, USA, 2019.
77. Moriasi, D.N.; Arnold, J.G.; Van Liew, M.W.; Bingner, R.L.; Harmel, R.D.; Veith, T.L. Model Evaluation guidelines for Systematic quantification of Accuracy in Watershed simulations. *Trans. ASABE* **2007**, *50*, 885–900. [\[CrossRef\]](#)
78. Wallace, C.W.; Flanagan, D.C.; Engel, B.A. Evaluating the Effects of Watershed Size on SWAT Calibration. *Water* **2018**, *10*, 898. [\[CrossRef\]](#)
79. Abbaspour, K.C.; Rouholahnejad, E.; Vaghefi, S.; Srinivasan, R.; Yang, H.; Kløve, B. A continental-scale hydrology and water quality model for Europe: Calibration and uncertainty of a high-resolution large-scale SWAT model. *J. Hydrol.* **2015**, *524*, 733–752. [\[CrossRef\]](#)
80. Jalowska, A.M.; Yuan, Y. Evaluation of SWAT Impoundment Modeling Methods in Water and Sediment Simulations. *J. Am. Water Resour. Assoc.* **2019**, *55*, 209–227. [\[CrossRef\]](#)
81. Santhi, C.; Arnold, J.G.; Williams, J.R.; Hauck, L.M.; Dugas, W.A. Application of a watershed model to evaluate management effects on point and nonpoint source pollution. *Trans. ASAE* **2001**, *44*, 1559–1570. [\[CrossRef\]](#)
82. Yuan, Y.; Chiang, L.C. Sensitivity analysis of SWAT nitrogen simulations with and without in-stream processes. *Arch. Agron. Soil Sci.* **2014**, *61*, 969–987. [\[CrossRef\]](#)
83. Sommerlot, A.R.; Nejadhashemi, A.P.; Woznicki, S.A.; Prohaska, M.D. Evaluating the impact of field-scale management strategies on sediment transport to the watershed outlet. *J. Environ. Manag.* **2013**, *128*, 735–748. [\[CrossRef\]](#) [\[PubMed\]](#)
84. Sharpley, A.N.; Kleinman, P.J.; Jordan, P.; Bergström, L.; Allen, A.L. Evaluating the Success of Phosphorus Management from Field to Watershed. *J. Environ. Qual.* **2009**, *38*, 1981–1988. [\[CrossRef\]](#) [\[PubMed\]](#)
85. Rittenburg, R.A.; Squires, A.L.; Boll, J.; Brooks, E.S.; Easton, Z.M.; Steenhuis, T.S. Agricultural BMP effectiveness and dominant hydrological flow paths: Concepts and a review. *J. Am. Water Resour. Assoc.* **2015**, *51*, 305–329. [\[CrossRef\]](#)
86. USDA NRCS. Conservation Effects Assessment Project (CEAP) Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Lower Mississippi River Basin, Washington, DC. 2013. Available online: <http://www.nrcs.usda.gov/technical/nri/ceap/> (accessed on 15 December 2021).
87. Malone, R.W.; Kersebaum, K.C.; Kaspar, T.C.; Ma, L.; Jaynes, D.B.; Gillette, K. Winter rye as a cover crop reduces nitrate loss to subsurface drainage as simulated by HERMES. *Agric. Water Manag.* **2017**, *184*, 156–169. [\[CrossRef\]](#)
88. Nouri, A.; Lee, J.; Yin, X.; Tyler, D.D.; Saxton, A.M. Thirty-four years of no-tillage and cover crops improve soil quality and increase cotton yield in Alfisols, Southeastern USA. *Geoderma* **2019**, *337*, 998–1008. [\[CrossRef\]](#)
89. Muñoz-Carpena, R.; Ritter, A.; Bosch, D.D.; Schaffer, B.; Potter, T.L. Summer cover crop impacts on soil percolation and nitrogen leaching from a winter corn field. *Agric. Water Manag.* **2008**, *95*, 633–644. [\[CrossRef\]](#)
90. Gabriel, J.L.; Quemada, M.; Martín-Lammerding, D.; Vanclooster, M. Assessing the cover crop effect on soil hydraulic properties by inverse modelling in a 10-year field trial. *Agric. Water Manag.* **2019**, *222*, 62–71. [\[CrossRef\]](#)
91. De Cima, D.S.; Luik, A.; Reintam, E. Organic farming and cover crops as an alternative to mineral fertilizers to improve soil physical properties. *Int. Agrophysics* **2015**, *29*, 405–412. [\[CrossRef\]](#)

92. Hudek, C.; Putinica, C.; Otten, W.; De Baets, S. Functional root trait-based classification of cover crops to improve soil physical properties. *Eur. J. Soil Sci.* **2022**, *73*, e13147. [[CrossRef](#)]
93. Pokhrel, S.; Kingery, W.L.; Cox, M.S.; Shankle, M.W.; Shanmugam, S.G. Impact of Cover Crops and Poultry Litter on Selected Soil Properties and Yield in Dryland Soybean Production. *Agronomy* **2021**, *11*, 119. [[CrossRef](#)]
94. Adeli, A.; Read, J.J.; Brooks, J.P.; Miles, D.; Feng, G.; Jenkins, J.N. Broiler Litter $\times$ Industrial By-Products Reduce Nutrients and Microbial Losses in Surface Runoff When Applied to Forages. *J. Environ. Qual.* **2017**, *46*, 339–347. [[CrossRef](#)] [[PubMed](#)]
95. Hu, J.; Miles, D.M.; Adeli, A.; Brooks, J.P.; Podrebarac, F.A.; Smith, R.; Lei, F.; Li, X.; Jenkins, J.N.; Moorhead, R.J. Effects of Cover Crops and Soil Amendments on Soil CO₂ Flux in a Mississippi Corn Cropping System on Upland Soil. *Environments* **2023**, *10*, 19. [[CrossRef](#)]

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