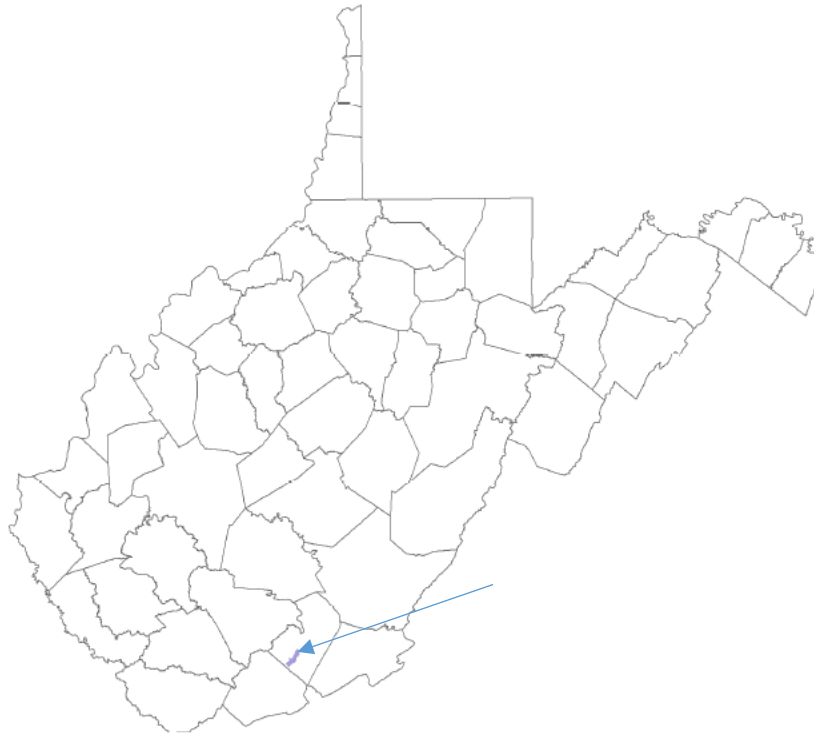


Pipestem Creek

WVKNB-1

Watershed Based Plan

HUC 12 - 050500020909



Submitted by the
West Virginia Conservation Agency
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Watershed Based Plan for Pipestem Creek

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INTRODUCTION

The purpose of this watershed based plan (WBP) is to define the problems, resources, costs and course of action necessary to restore the impaired streams of the Pipestem Creek watershed to full compliance with water quality standards. Following this watershed based plan will implement the Total Daily Maximum Load (TMDL) set for these streams by the WV Department of Environmental Protection (DEP).

Pipestem Creek, stream code WVKNB-1, is a significant tributary to the Bluestone River, with confluence at the Bluestone Lake Marina. It was named for the fact early settlers fashioned pipe stems from a plant, narrowleaf meadowsweet (*Spiraea alba*) Figure 1, a locally common shrub which grew along the creek's banks. The Pipestem Creek watershed is a rural watershed with the predominant land use being grazing based agricultural with two small communities and several farms scattered throughout. The watershed is 8,948 acres with 23% being pasture and crop land, 74% being forest land, 2% being water and wetlands and only 1% urban.

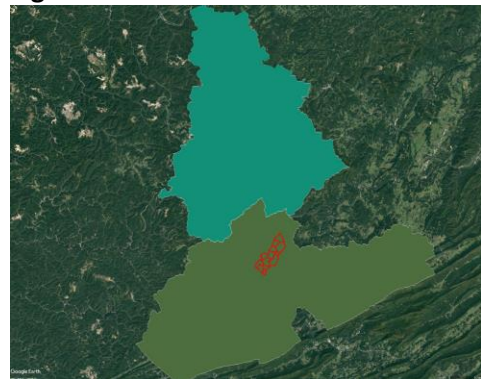
Figure 1



The most significant concern by the citizens of this watershed is the overall amount of pollutants that reaching the stream via storm water runoff, failing septic systems, and the lack of septic systems. The public feels that there may be issues with excess nutrients from fertilizers, bacteria from lack of sewage treatment, and even petroleum's from old and leaking fuel tanks. Much of this information was brought to light during a public meeting on April 23, 2018. At this meeting, stakeholders discussed the possibilities of developing a watershed association to sponsor projects that would aid in cleaning up the watershed. While everyone at this meeting agreed with the concept, it was pointed out that the availability of volunteers may be limited.

Pipestem Creek has been listed in the 2008 303(d) list as being impaired by fecal coliform contamination. It is included in the 2008 Lower New River Watershed (Figure 2) TMDL. The WV Conservation Agency (WVCA) working with and through the Southern Conservation District (GVCD) will be the lead agency on this project. The WVCA will work with the Summers County health department on the failing septic system issue and the USDA National Resource and Conservation Agency (NRCS) on agricultural issues. The WVCA will also coordinate closely with the DEP's Nonpoint Source Program (NPS) with \$319 grant applications and reporting. The only known threatened or endangered species known to may be inhabiting this watershed are Virginia Spiraea based on the NRCS ICT Tool. This plan is not expected to have a negative impact on this species, additionally practice's such as riparian buffers and exclusion fencing should enhance habitat for this species.

Figure 2



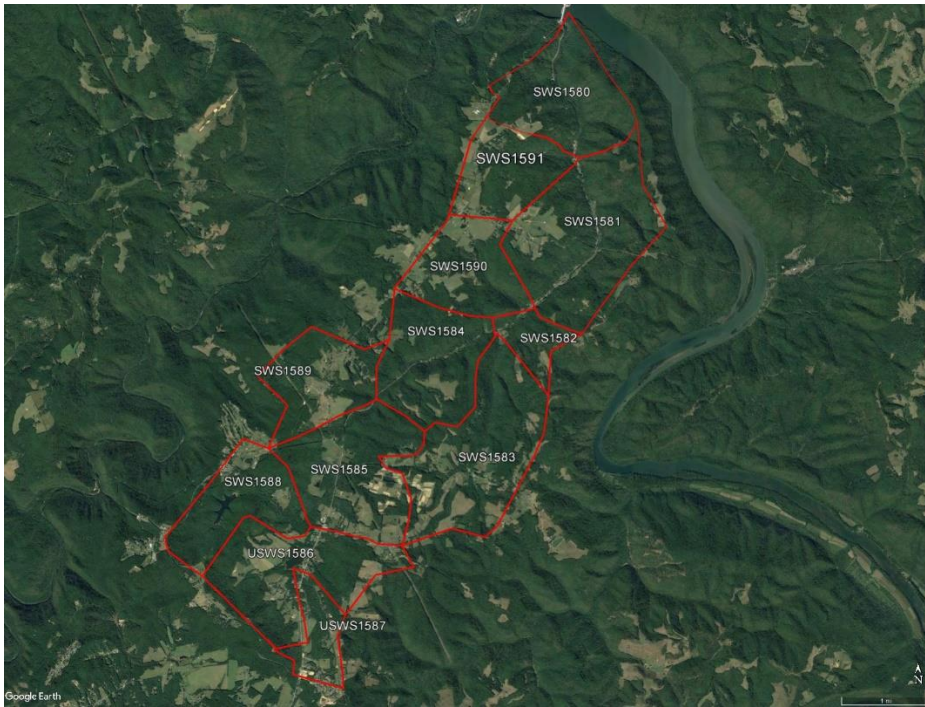


Figure 3. SWS locations within the watershed

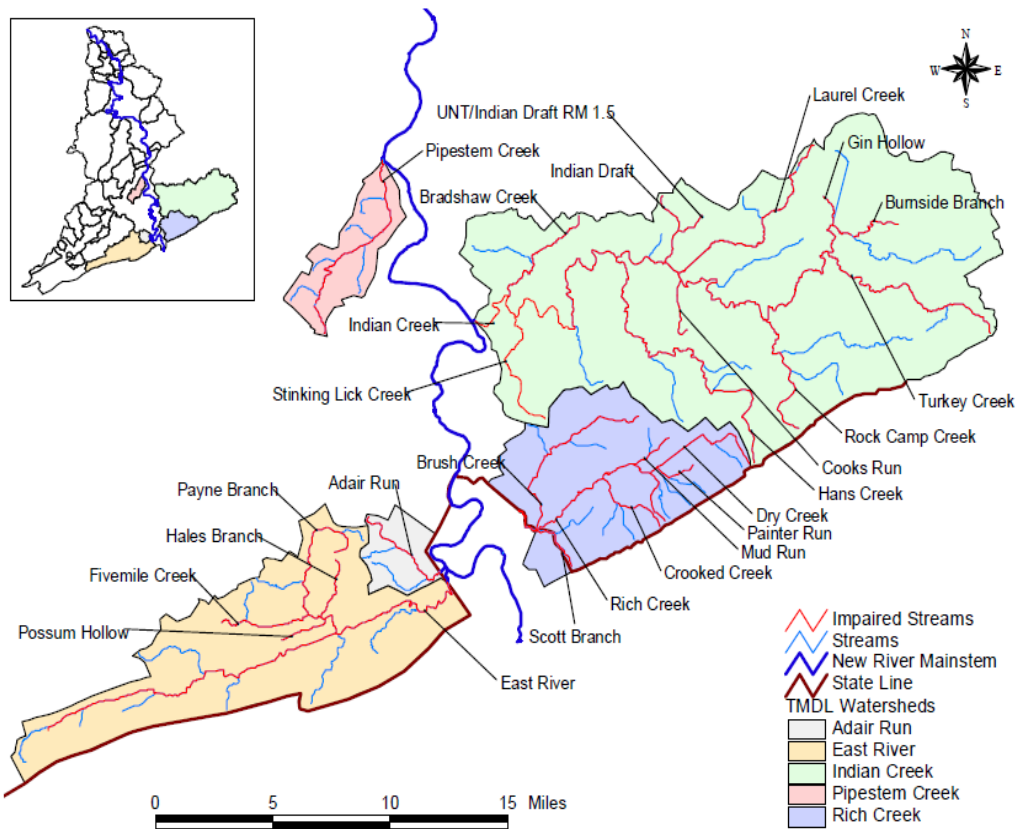


Figure 4. Impaired waterbodies under TMDL development in the Upper New River

CAUSES AND SOURCES

Section 303(d) of the federal Clean Water Act requires states to identify waterbodies that do not meet water quality standards and to develop appropriate TMDLs. A Total Maximum Daily Load (TMDL) establishes the maximum allowable pollutant loading for a waterbody to achieve compliance with established water quality standards. It also distributes the load among pollutant sources establishing load reduction goals from each source.

The TMDL for the New River watershed was approved by the U.S. Environmental Protection Agency (USEPA) in 2008. The TMDL model was based on extensive water quality monitoring from May 2004 through May 2005 by the WVDEP. The results of that monitoring were used to confirm the impairments to streams identified on previous 303(d) lists and to identify other impaired streams that were not previously listed. The TMDL identifies fecal coliform as the cause of impairment in the Pipestem Creek watershed.

Table 1. Pre TMDL Data collected by WVDEP

Date	Fecal	Temp	DO	pH
July 2004	440	20.89	8.78	7.87
July 2004	350	18.37	9.37	7.56
August 2004	80	19.33	9.2	8.19
August 2004	200	19.04	8.34	7.51
September 2004	120	17.82	9.3	7.96
September 2004	340	20.39	7.65	7.2
October 2004	60	10.93	10.85	7.71
October 2004	48	10.24	11.06	6.49
November 2004	34	14.72	10.34	8.2
November 2004	54	14.69	8.55	6.69
December 2004	510	8.11	10.43	7.47
December 2004	220	7.21	10.82	7.18
January 2005	94	8.52	11.83	7.24
January 2005	32	9.04	10.81	6.25
February 2005	32	4.74	12.36	8.02
February 2005	30	4.22	11.76	7.95
March 2005	28	3	12.2	6.76
March 2005	8	2.96	11.8	6.46
April 2005	66	7.4	11.7	7.62
April 2005	44	8.97	10.69	6.9
May 2005	48	16.13	9.95	8.04
May 2005	50	13.51	9.43	7.18
Station Located at 37.60580556 , -80.91775000				
Station Located at 37.5338611 , -80.96577778				



Livestock grazing in close to streams deplete the riparian area of necessary vegetation to hold soils and prevent erosion. This also leads to warmer soils and water in the stream allowing for accelerated bacteria growth. This bacteria may then access the stream through sedimentation and then survives by feeding on organic material that naturally exist aquatic ecosystems.

Data obtained from pre-TMDL monitoring was compiled, and the impaired waters were modeled to determine baseline conditions and the gross pollutant reductions needed to achieve water quality standards. A TMDL is composed of the sum of individual waste load allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include a margin of safety (MOS) that accounts for uncertainty in the relationship between pollutant loads and the quality of the receiving stream. TMDLs can be expressed in terms of mass per time or other appropriate units. TMDLs are calculated by the following equation:

$$\text{TMDL} = \text{sum of WLAs} + \text{sum of LAs} + \text{MOS}$$

The determination of impaired waters involves comparing instream conditions to applicable water quality standards. West Virginia’s water quality standards are codified at Title 47 of the *Code of State Rules (CSR), Series 2, titled Legislative Rules, Department of Environmental Protection: Requirements Governing Water Quality Standards*. Water quality standards consist of three components: designated uses; narrative and/or numeric water quality criteria necessary to support those uses; and an antidegradation policy.

In the New River watershed, water contact recreation and public water supply are listed as the designated uses that have been impaired based on the water quality criteria for fecal coliform bacteria. The water quality standard for human health from 47 CSR, Series 2, *Legislative Rules, Department of Environmental Protection: Requirements Governing Water Quality Standards* is:

“Human Health Criteria Maximum allowable level of fecal coliform content for Primary Contact Recreation (either MPN [most probable number] or MF [membrane filter counts/test]) shall not exceed 200/100 mL as a monthly geometric mean based on not less than 5 samples per month; nor to exceed 400/100 mL in more than 10 percent of all samples taken during the month.”

The New River TMDL shows that there are is one point sources within Pipestem Creek, but most of the impairments come from nonpoint sources. The TMDL calls for a 37.35% reduction in fecal coliform levels for Pipestem Creek (Table 1) from these sources. The TMDL identifies one basins in the watershed with 12 sub-watersheds numbers 1580 to 1591 assigned to identify them.

Table 2: Pipestem Creek TMDL (from the New River TMDL)

New River Watershed - Fecal Coliform TMDLs (Average Annual)

TMDL Watershed	Stream Code	Stream Name	Baseline LA (counts/yr)	LA (counts/yr)	Baseline WLA (counts/yr)	WLA (counts/yr)	MOS (counts/yr)	TMDL (counts/yr)	% Reduction
Pipestem Creek	WVKB-1	Pipestem Creek	5.07E+13	3.18E+13	2.49E+10	2.49E+10	1.67E+12	3.35E+13	37.35

The TMDL identifies two land use sources for the fecal coliform pollution: agriculture and on-site wastewater treatment. The agricultural land use specifically identified as contributing to the contamination is pasture/cropland.

Table 3: Baseline loads from Pasture land use

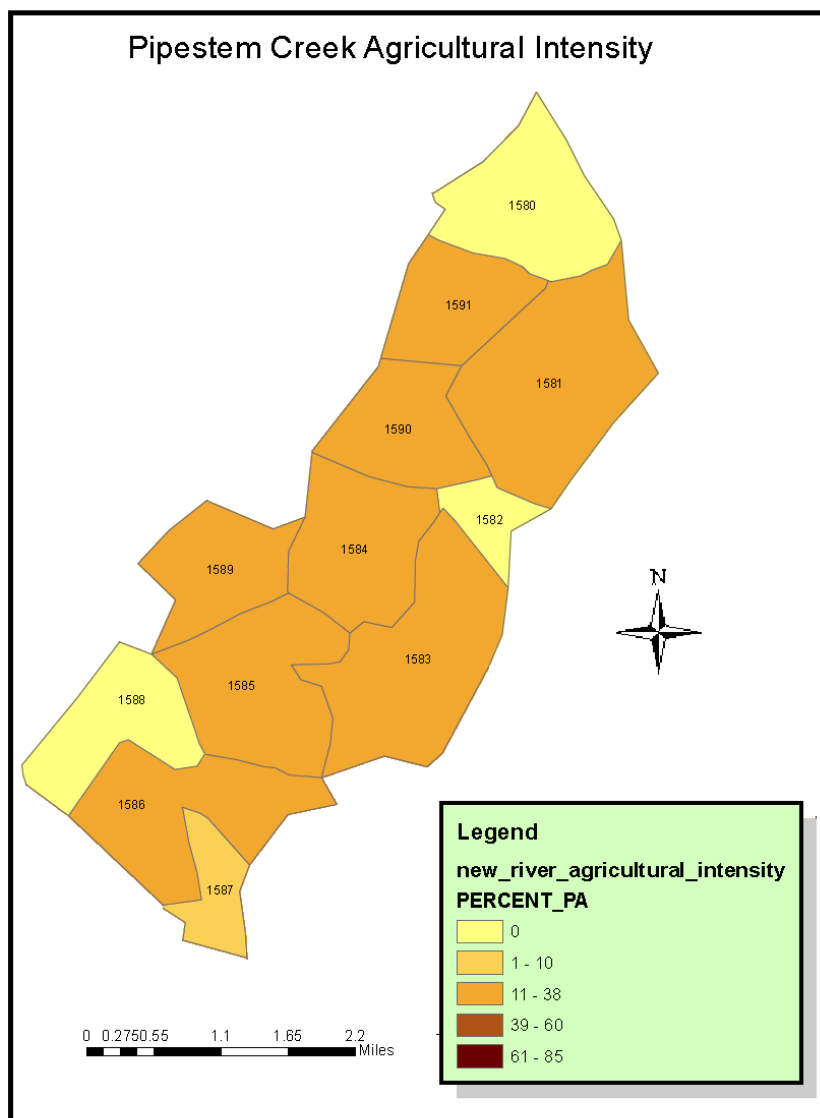
New River Watershed - Fecal Coliform Load Allocations

TMDL Watershed	Sub watershed	Stream Name	Stream Code	Pasture/Cropland Baseline Load (counts/yr)	Pasture/Cropland Allocated Load (counts/yr)	Pasture/Cropland Percent Reduction
Pipestem Creek	1580	Pipestem Creek	WVKNB-1	1.91E+10	1.91E+10	0.0
Pipestem Creek	1581	Pipestem Creek	WVKNB-1	4.00E+12	2.64E+12	34.0
Pipestem Creek	1582	Pipestem Creek	WVKNB-1	0.00E+00	0.00E+00	0.0
Pipestem Creek	1583	UNT/Pipestem Creek RM 4.23	WVKNB-1-L	9.24E+12	4.23E+12	54.2
Pipestem Creek	1584	Pipestem Creek	WVKNB-1	1.89E+12	1.89E+12	0.0
Pipestem Creek	1585	Pipestem Creek	WVKNB-1	7.21E+12	4.71E+12	34.7
Pipestem Creek	1586	Pipestem Creek	WVKNB-1	6.96E+12	4.52E+12	35.1
Pipestem Creek	1587	Pipestem Creek	WVKNB-1	6.00E+11	6.00E+11	0.0
Pipestem Creek	1588	UNT/Pipestem Creek RM 7.95	WVKNB-1-W	0.00E+00	0.00E+00	0.0
Pipestem Creek	1589	UNT/Pipestem Creek RM 5.9	WVKNB-1-P	4.49E+12	2.47E+12	45.0
Pipestem Creek	1590	UNT/Pipestem Creek RM 3.76	WVKNB-1-J	4.58E+12	2.52E+12	45.0
Pipestem Creek	1591	UNT/Pipestem Creek RM 1.72	WVKNB-1-C	4.12E+12	1.59E+12	61.4

Agriculture

In the agricultural land use category only seven of the sub-watersheds, 1518, 1583, 1585, 1586, 1589, 1590, and 1591, contribute fecal coliform to Pipestem Creek. The largest contributor is SWSs 1583. The TMDL model looks at agricultural intensity zones and the run off potential of the land to determine the need for reductions. The most agricultural intensive area is in the upper most reaches of the watershed.

Figure 5: Agricultural Intensity Zones



On-site Wastewater Sewage Treatment

In the on-site wastewater category reductions are called for in all 12 sub-watersheds. The determination of the baseline contribution and reduction is based on several factors including residential density, soil porosity and proximity to the stream or underground drainage. These factors go into modeling the vulnerability to pollution from failing septic systems.

To calculate failing septic wastewater flows, the watersheds were divided into four septic failure zones during the source tracking process. Septic failure zones were delineated by geology and defined by rates of septic system failure. Two types of failure were considered: complete failure and periodic failure. In the model a complete failure was defined as 50 gallons per house per day of untreated sewage escaping a septic system as overland flow to receiving waters. Periodic failure was defined as 25 gallons per house per day of untreated sewage escaping a septic system as overland flow to receiving waters. A

base concentration of 25,000 counts per 100 mL was used as a beginning concentration for failing septic. In the Pipestem Creek watershed there is only one identified septic failure zones, medium.

The TMDL calculates the estimated number of residences with septic system failures in each vulnerability zone. The percentages of homes estimated to have failing septic systems are listed by zone in Table 4.

Table 4: Percentage of Homes with Failing Systems by Septic Zone

Seasonal Failure: Assume 25 gpd/home failing septic effluent reaching stream		
Complete Failure: Assume 50 gpd/home failing septic effluent reaching stream		
Type	% homes with seasonal failure	% homes with complete failure
Medium	13.00	24.00

The TMDL model estimates the number of residences with some form of septic system failure by sub-watershed. The calculations often end in a fraction but, this can't exist, either a system is failing or it is not. Table 4b shows the whole number estimates of the number of periodic and complete failures in the watershed. The total number of septic failures are:

Table 4b

TMDL Modelled Periodic Failures	57
TMDL Modelled Complete Failures	112

Table 5: The Number of Failing Systems by SWS

SUBID	Total 911 Structures	Homes with Septic in Failure Zone Medium	Homes with Seasonal Failure's	Homes with Complete Failure's
1580	35	18	2	4
1581	132	71	9	17
1582	21	11	1	2
1583	93	50	6	12
1584	34	18	2	4
1585	66	35	4	8
1586	165	89	11	21
1587	55	29	3	6
1588	42	22	2	5
1589	92	49	6	11
1590	71	38	4	9
1591	103	55	7	13

LOAD REDUCTIONS REQUIRED

All management measures prescribed in this plan will achieve the TMDL/water quality goals by preventing bacteria laden runoff and direct deposit of bacteria from entering surface waterways. The repair of failing septic systems will allow soils to naturally filter waste water, while agricultural practices will prevent livestock from over grazing and causing erosion, as well as loafing in the riparian areas and concentrating waste in areas prone to runoff. This Watershed Based Plan will utilize modeled research findings from the USDA Agricultural Service, Appalachian Small Farm Center (Beckley, WV), and other research to determine the baseline load per animal and the efficiencies of practices to determine expected load reductions based on management measures.

The load reductions being called for in this watershed based plan are based on the TMDL for the entire Lower New River Watershed. The TMDL is a load allocation that expresses what can enter the stream. Load reduction (LR) targets are determined by subtracting the TMDL from baseline load (BL) levels:

$$LR = BL - TMDL$$

LR is the accumulated reductions from practices installed during the implementation process. As such, it becomes the primary criteria for tracking environmental results.

In Pipestem Creek, load allocations (LA) for the number of fecal coliforms that can be assimilated in the stream without impairment are assigned to the Pasture/Cropland and On-site Sewer Systems land uses. In the Pasture/Cropland (agriculture) category, reductions are required in SWS 1581, 1583, 1585, 1586, 1589, 1590, and 1591. In the On-site Sewer Systems (failing septic's) category all SWS have 100% reductions called for. This is because the West Virginia Bureau for Public Health regulations prohibits the discharge of sewage into the waters of the state. Assigning any allocation to this category would be condoning a violation of those regulations.

The TMDL calls for a reduction of fecal coliform of 1.79E+13 cfu/yr for agriculture and 1.03E+12 cfu/yr from failing septic systems for a total reduction of 1.90E+13 cfu/yr from the Pipestem Creek Watershed, in its entirety.

Agriculture

The TMDL calls for reductions from agriculture in only seven of the 12 SWS subwatersheds, 1581,1583,1585,1586,1589,1590, and 1591, the other sub watersheds only contribute through failing septic systems to the impairment of Pipestem Creek. Since Pipestem Creek is listed as impaired from mouth to headwaters agricultural projects should be considered in all subwatersheds with priority given to those in the high and very high agricultural intensity zones to meet the TMDL load reduction of 1.79E+13 cts/yr fecal coliform

Table 6: Land use allocations in the TMDL

Sub watershed	Pasture Cropland Baseline Load (counts/yr)	Pasture Cropland Allocated Load (counts/yr)	Total Pasture and Crop Reduction Required (counts/yr)	Pasture Cropland Percent Reduction	Onsite Sewer Systems Baseline Load (counts/yr)	Onsite Sewer Systems Allocated Load (counts/yr)	Onsite Sewer Systems Percent Reduction	Total Required Load Reductions
1580	1.91E+10	1.91E+10	0.00E+00	0.0	3.98E+10	0.00E+00	100	3.98E+10
1581	4.00E+12	2.64E+12	1.36E+12	34.0	1.50E+11	0.00E+00	100	1.51E+12
1582	0.00E+00	0.00E+00	0.00E+00	0.0	2.39E+10	0.00E+00	100	2.39E+10
1583	9.24E+12	4.23E+12	5.01E+12	54.2	1.06E+11	0.00E+00	100	5.12E+12
1584	1.89E+12	1.89E+12	0.00E+00	0.0	3.87E+10	0.00E+00	100	3.87E+10
1585	7.21E+12	4.71E+12	2.50E+12	34.7	7.51E+10	0.00E+00	100	2.58E+12
1586	6.96E+12	4.52E+12	2.44E+12	35.1	1.88E+11	0.00E+00	100	2.63E+12
1587	6.00E+11	6.00E+11	0.00E+00	0.0	6.26E+10	0.00E+00	100	6.26E+10
1588	0.00E+00	0.00E+00	0.00E+00	0.0	4.78E+10	0.00E+00	100	4.78E+10
1589	4.49E+12	2.47E+12	2.02E+12	45.0	1.05E+11	0.00E+00	100	2.13E+12
1590	4.58E+12	2.52E+12	2.06E+12	45.0	8.08E+10	0.00E+00	100	2.14E+12
1591	4.12E+12	1.59E+12	2.53E+12	61.4	1.17E+11	0.00E+00	100	2.65E+12
Totals	4.31E+13	2.52E+13	1.79E+13		1.03E+12			
Total Reduction	1.90E+13							

According to data from the USDA ARS (Agricultural Research Service), cattle produce between 5.4E+9 to 2.1E+10. The medium figure of 1.35E+10 of this range will be used in this watershed based plan for calculating potential load reductions of individual conservation plans.

Example calculation: if a conservation plan restricts 100 head of cattle from a stream and the plan is 95% efficient, then $\rightarrow 100 \text{ head} \times 1.35\text{E}+10 \times .95 = 1.28\text{E}+12$ counts per year load reduction.

Table 7. USDA-ARS data regarding bacteria production by species/year

Humans	2.0E+9	Pig	8.9E+9
Chickens	2.4E+8	Sheep	1.8E+10 to 3.7E+10
Cow	5.4E+9 to 2.1E+10	Lamb	1.5E+10
Calf	1.0E+10	Turkey	1.3E+8
Duck	1.1E+10		

It is impossible to develop a true load reduction for each management measure as these management measures must work together in a system to accomplish a single goal. For this reason the load reductions calculated in this plan utilized a model developed from table 10 to determine how many management measures are necessary to accomplish the goals of the plan.

On-site Wastewater

The TMDL determines the fecal coliform loads by estimating the gallons per day (GPD) of contaminated flow entering the streams. The New River TMDL used a base concentration for raw sewage of 25,000 counts/100ml. To determine the counts per year of fecal coliform the TMDL used the formula:

$$\text{Counts/yr} = \text{concentration (25,000/100mL)} * 1000 \text{ mL/L} * \text{flow gal/day} * 3.785 \text{ L/gal} * 365 \text{ day/yr}$$

The variable for each subwatershed is the flow so the formula becomes: $\text{Counts/yr} = \text{Flow (GPD)} * 345,381,250$. The TMDL technical document lists the flow for each subwatershed as shown in Table 8.

Table 8: Septic Flow per SWS

SUBID	VL_Flow (gpd)	L_Flow (gpd)	M_Flow (gpd)	H_Flow (gpd)	Total_Flow_gpd
1580	0	0	288.225	0	288.225
1581	0	0	1087.02	0	1087.02
1582	0	0	172.935	0	172.935
1583	0	0	765.855	0	765.855
1584	0	0	279.99	0	279.99
1585	0	0	543.51	0	543.51
1586	0	0	1358.775	0	1358.775
1587	0	0	452.925	0	452.925
1588	0	0	345.87	0	345.87
1589	0	0	757.62	0	757.62

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1590	0	0	584.685	0	584.685
1591	0	0	848.205	0	848.205

Total 7485.615

The total septic load equals the load reduction required in the TMDL as shown in Table 9.

Table 9: Septic Load and Reductions Required per SWS

Expected Load Reductions Expected for Addressing Failing Septic Systems

SWS	Total Flow	Baseline Load	Counts per	Load Reduction	Load Reduction	Total 911
Number	Gal per Day	Counts Per Yr	Gallon	per system	per system	Structures
				Seasonal Fail	Complete Fail	
1580	288.225	3.98E+10	3.78E+05	2	4	35
1581	1087.02	1.50E+11	3.78E+05	9	17	132
1582	172.935	2.39E+10	3.78E+05	1	2	21
1583	765.855	1.06E+11	3.78E+05	6	12	93
1584	279.99	3.87E+10	3.78E+05	2	4	34
1585	543.51	7.51E+10	3.78E+05	4	8	66
1586	1358.775	1.88E+11	3.78E+05	11	21	165
1587	452.925	6.26E+10	3.78E+05	3	6	55
1588	345.87	4.78E+10	3.78E+05	2	5	42
1589	757.62	1.05E+11	3.78E+05	6	11	92
1590	584.685	8.08E+10	3.78E+05	4	9	71
1591	848.205	1.17E+11	3.78E+05	7	13	103

Since the TMDL requires a 100% reduction from all on-site treatment sources, the baseline load is also the expected load reduction for each SWS.

MANAGEMENT MEASURES

All management measures to be installed to restore these streams must come about with the voluntary cooperation of the landowners. To do this the project managers will offer a variety of practices which can be specifically designed or combined to suit the circumstances for each farm or residence. The two

primary causes of impairment according to the TMDL are inadequate on-site wastewater treatment (failing septic systems), cropland and livestock pasture.

On-site wastewater treatment

Two categories of failing septic systems have been identified: completely and periodically failing systems. Experience has shown that completely failing systems usually indicates a lack of any system or one that is so antiquated or poorly maintained it fails on a year-round basis. Periodically failing systems are usually septic systems that are not being properly maintained so that the drain fields are not functioning as they should and fail during the wet season. To determine the specific needs a field survey must be conducted first to identify problem sites. This will require the participation of the county Health Departments (HD). Once a problem site has been identified a specific project plan can be developed and must be approved by the HD.

Completely failing systems usually require the installation of a new or upgraded system. New or upgraded systems will be installed in compliance with HD regulations based on home size and soil porosity and must be approved by the HD Sanitarian. If a failing system is in an area where public sewer is available, the residence will be hooked up to the public system. The average cost for such a project is about \$7000 but can range widely due to specific circumstances. Similar efforts in other watersheds throughout the state have used a combination of Section 319 grants administered through Conservation Districts and low interest loans from the On-Site Loan Program (OSLP) administered through the WVDEP to fund these system replacements.

Periodically failing systems are usually systems where pumping the system combined with proper maintenance will solve the problem. In most cases this has cost less than \$300 per home. Individual costs could be higher due to the remoteness of the residence. Due to the sparse population density in the watershed cluster systems would not be cost effective. However, if the survey shows a grouping of failures in one location such a system could be an option.

Assuming a new system for complete failures and pumping for periodic failures then this plan calls for 112 new systems and 57 pumping.

Livestock Pasture

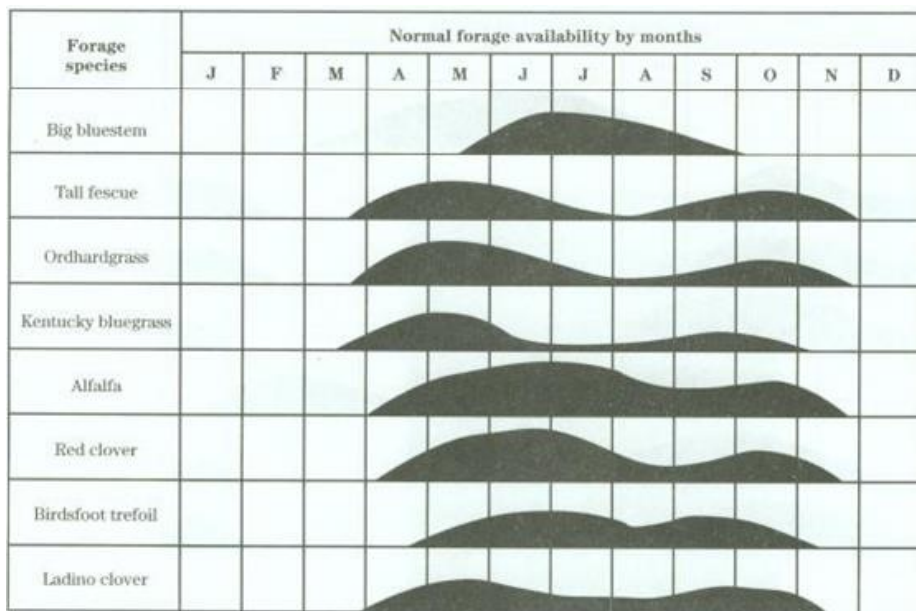
To reduce fecal coliform pollution of these streams technicians with the WVCA and the USDA NRCS will work closely with the farmers to develop conservation plans. The goal of these plans will be to install practices that will reduce the time livestock spend in or near a stream or ephemeral drainage. These practices will also have the intent of dispersing the livestock to avoid serious damage from trampling and manure build up. These management measures will be planned to assure they meet the overall load reduction required by the TMDL. These BMPs will be implemented through sound conservation planning and funded by various State and Federal Programs such as, Clean Water Act Section 319 grants USDA Environmental Quality Incentive Program (EQIP), EQIP Focused Conservation Approach, SCD/WVCA Agricultural Enhancement Program, and landowner contributions. Where appropriate, these practices will be combined with the stream bank restoration. The result will be a comprehensive conservation plan for each farm.

The following BMP's are practices recommended by NRCS that are necessary to achieve the goals of the TMDL target reductions.

Conservation Plans: A record of landowners' decisions combined with a combination of agronomic, management and engineered practices that protect and improve soil productivity and water quality; the plan must meet agency technical standards. These plans include technical advice prepared by a certified conservation planner. All practices included in the USDA Natural Resources Conservation Service Field Office Technical Guide are eligible to be included in a conservation plan.

According to a model developed by Burns 2011 (Appendix A), based on research conducted in nearby watersheds by Boyer et al; it can be determined that if conservation plans are implemented that include nutrient management, prescribed grazing, and water distribution, then 90% or more load reduction should be seen per conservation plan once they are fully implemented and land unit has responded with adequate vegetation ground cover. This occurs as forage communities mature and their growth patterns match the rotational grazing trends to provide adequate ground cover, forcing infiltration of Stormwater and reducing potential for erosion.

Figure 5. Typical Growth patterns of common perennial pasture forages in the watershed. The most common species are Tall fescue, orchard grass, and Kentucky bluegrass.



Alternative watering sources, with fencing: To reduce occurrences of livestock coming into direct contact with a stream or other waterway, a narrow strip of land along the stream bank can be fenced off. Alternative watering sources, such as spring development and wells with pipelines and troughs, must then be provided for the livestock. This will prevent livestock from defecating in or close to the stream and reduce stream bank erosion. This includes dry hydrants for any systems that have enough water to support them. Dry hydrants are needed in case of drought conditions. They aid in grass fire suppression and alternative water for livestock during a drought. This reduces erosion common after fires and eliminates the need to allow livestock into the riparian buffer zones for water. NRCS

conservation practices that can accomplish this are: 378 Pond, 382 Fence, 516 Pipeline, 533 Pumping Plant for Water Control, 574 Spring Development, 587 Structure for Water Control, 614 Watering Facility, 636 Water Harvesting Catchment, 642 Well, 472 Access Control. These practices correspond to BMP efficiencies in Table 10 for: off-site watering systems and fencing. In most situations, alternative watering sources are installed prior to any exclusion or pasture division fencing. This allows for appropriate infrastructure to be in place when the management system is initiated. It has been observed in other recent 319 project watersheds that as soon as an alternative watering system is put in place, that livestock prefer to drink from the water troughs as opposed to streams and ponds. This observation is consistent with the Chesapeake Bay model allowing for a 50% load reduction by installing a watering system without exclusion fence.

Heavy Use Area Protection: Practices that restore or put into proper use, areas that are or have been used by large numbers of areas for feeding, walking, loafing. NRCS conservation practices that can accomplish this are: 313 Waste Storage Facility, 342 Critical Area Planting, 484 Mulching, 512 Pasture & Hayland Planting, 528 Prescribed Grazing, 560 Access Road, 561 Heavy Use Area Protection, 575 Animal Trails and Walkways, 561 Heavy Use Area Protection., as well as various erosion and sediment control measures according to the WV Erosion and Sediment Control Handbook. These practices correspond to BMP efficiencies in Table 10 for: Sediment Pond/Swale in combination with filter strip and fencing.

Addressing load reductions associated with heavy use area protection is directly related to soil loss. Calculating this load reduction should be done utilizing the Revised Universal Soil Loss Equation, $A=RK(LS)CP$. A = Tons of soil lost per year, R = rainfall factor, K = soil erodibility factor, LS = length of slope factor, C = ground cover factor, P = practice factor. The difference of A between pre- and post-practice installation would be the total sediment load reduction measured in tons per year. This figure can be converted to a bacteria load reduction by understanding the typical fecal coliform bacteria concentration of the soils. For example, in nearby watersheds it has been determined that the typical concentration of soil FC Bacteria is 50 counts per gram which calculates to $4.5E+7$ counts per ton ($907,185$ grams/ton of soil X 50 counts per gram of soil = $4.5E+7$ counts per ton). Thus, if a practice is reducing 100 tons of soil from eroding per year then the practice is also reducing $4.5E+9$ counts of bacteria per year as well ($100 \times 4.5E+7 = 4.5E+9$). See appendix E for soil loss calculation charts.

Nutrient Management Plans: Farm operators develop a comprehensive plan through traditional and maintaining yield and appropriate ground cover. NRCS conservation practices that can accomplish this are: 100 CNMP Development, 528 Prescribed Grazing, 512 Forage and Biomass Planting, 313 Waste Storage Facility, 316 Animal Mortality Composter, 328 Conservation Crop Rotation, 329 Residue Management, 340 Cover Crop, 590 Nutrient Management, 634 Manure Transfer. These practices correspond to BMP efficiencies in Table 10 for: Waste Stabilization Lagoon and fencing.

Prescribed grazing, which can serve as both a heavy use area protection and a nutrient management practice refers to the development of rotational grazing systems and maintaining appropriate livestock carrying capacity. Frequent rotations assure the even distribution of nutrients throughout the pasture system and reduces erosion by maintaining adequate ground cover. Carrying capacity is based on forage productivity, livestock utilization rate, and livestock forage consumption requirements. Other

variables include pasture rotation schedule, and regrowth rate of forages. For example, an average sward of pasture grass will produce 300 lbs. per acre inch and an average cow will require 25 lbs. of forage per day. If maintaining a rotational grazing system on a 7-day rotation, livestock will only utilize 55% of the available forage. So, if the pasture is 100 acres and cows are turned in at a forage height of 10 inches, then there would be 3,000 lbs. of forage available per acre; if the livestock will only utilize 55% of this forage, then only 1,650 lbs. will be usable forage, and the pasture can only support 66 head ($1,650/.55 = 66$). The utilization rate of forage increases as the rotation schedule speeds up. This equation is designed to maintain a minimum of 2-4 inches of ground cover. See Appendix D for livestock carrying capacity worksheets.

Animal Waste Management Systems: livestock operators design practices for proper storage, handling, and use of wastes generated from confined animal operations. This includes a means of collecting, scraping, or washing wastes and contaminated runoff from confinement areas into appropriate waste storage structures. Livestock feedlots and dairies commonly utilize waste lagoons or move animal feeding areas away from the streamside or other areas where stockpiled manure can lead to bacteria laden runoff into a surface waterway. NRCS conservation practices that can accomplish this are: 313 Waste Storage Facility, 359 Waste Treatment Lagoon, 651 Heavy Use Area Protection, 367 Roofs and Covers, 558 Roof Runoff Structures, 620 Underground Outlet, 606 Subsurface Drain.

Land Use Covenants: These covenants would control or restrict certain land use activities in highly sensitive areas. In some cases, simply re-purposing the areas will be beneficial. For example, converting a hayfield into pasture to allow for more grazing area and better distribution of livestock waste. All conservation practices listed in this plan could be used in this situation.

Conservation Easements: These easements compensate landowners for voluntarily restricting their activities in sensitive areas.

Riparian Buffer practices: Areas of vegetation (herbaceous or woody) that are tolerant of intermittent flooding or saturated soils and that are established or managed in the transitional zone between terrestrial and aquatic habitats. These buffers also serve a functional role as they build soil over time, preventing upslope sedimentation, and protecting the stream from runoff and providing shade to reduce temperatures. NRCS conservation practices that can accomplish this are: 314 Brush Management, 390 Riparian Herbaceous Cover, 412 Waterways, 468 Lined Waterways, 490 Tree/Shrub Site Prep, 612 Tree/Shrub Establishment, 391 Riparian Forest Buffer. These practices correspond to BMP efficiencies in Table 10 for: Buffer and fencing.

Filter Strip: A strip or area of herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forestland) and environmentally sensitive areas. These areas allow runoff to infiltrate the soils and filter bacteria and nutrients before entering the waterways. NRCS conservation practices that can accomplish this are: 393 Filter Strip. These practices correspond to BMP efficiencies in Table 10 for: Filter Strip and fencing.

Erosion and sediment control: Practices that protect water resources from sediment pollution and increases in runoff associated with land development activities. Bacteria is often transported by eroded

soils. By retaining soil on-site, sediment and attached nutrients are prevented from leaving disturbed areas and polluting streams. *Examples:* Silt fence, slope drain, permanent vegetation. NRCS conservation practices that can accomplish this are: 342 Critical Area Planting, 395 Stream Habitat Improvement and Management, 580 Streambank and Shoreline Protection, 362 Diversion, and 561 Heavy Use Area Protection. Other practices are available and located in the WV Erosion and Sediment Control Handbook. These practices correspond to BMP efficiencies in Table 10 for: sediment ponds/swale in combination with filter strip.

Historically, when comparing Pipestem Creek to other similar projects the following types of BMPs are expected:

- Watering systems (pipelines, troughs, spring developments, wells, ponds, etc.)
- Fencing (exclusion for stream protection and divisional for rotational grazing)
- Roofed and un-roofed livestock waste storage facilities
- Nutrient management and Grazing planning

The TMDL calls for an average load reduction of 32% from all pasture and cropland in the greater Pipestem Creek Watershed, this would require 599 acres to be impacted by this plan. If farms in this watershed average 100 acres (including woodlands), then 7 farms must be impacted by this plan, one farm in each impaired watershed. To accomplish the required load reductions, the following types and numbers of agricultural BMPs are expected to be installed:

Number of Farms	7
Acres in Conservation/Nutrient Plans	778
Exclusion Fence (feet)	29218
Division Fence (feet)	43827
Pipeline (feet)	14609
Water Troughs	42
Waste Storage Facility	2
Stream Crossings	7
Water Development	7

The conservation plans for the 7 farms will be developed to best suit the circumstances and problems for each farm and may include some or all the above mentioned BMPs.

Table 10. Indicates the estimated efficiency of specific BMP’s for reducing bacteria.

	Conservation Practice System	Expected Load Reduction
1	Livestock Exclusion	85%
2	Buffer	85%
3	Buffer with First Flush Prevention	99%
4	Alternative Watering System, Continuous Grazing	50%
5	Alternative Watering System, Rotational Grazing	90%
6	Livestock Waste Storage Facility	90%
7	Fully Implemented Resource Management System	99%

Table 11. Estimated number of farms to be Impacted by this Watershed Based Plan by SWS

SUBBASIN	STREAM NAME	WV CODE	Total Pasture/Crop Land (acres)	Estimated Number of Farms	Estimated Number of Farms to be Impacted by WBP
1580	Pipestem Creek	WVKNB-1	34	1	0
1581	Pipestem Creek	WVKNB-1	171	1	1
1582	Pipestem Creek	WVKNB-1	27	1	0
1583	UNT/Pipestem Creek	WVKNB-1-L	396	3	1
1584	Pipestem Creek	WVKNB-1	81	1	0
1585	Pipestem Creek	WVKNB-1	309	2	1
1586	Pipestem Creek	WVKNB-1	298	2	1
1587	Pipestem Creek	WVKNB-1	97	1	0
1588	UNT/Pipestem Creek	WVKNB-1-W	98	1	0
1589	UNT/Pipestem Creek	WVKNB-1-P	192	2	1
1590	UNT/Pipestem Creek	WVKNB-1-J	196	2	1
1591	UNT/Pipestem Creek	WVKNB-1-C	176	2	1
Total			2075	19	7
37.35% of Total			778	7	

The below chart, table 12, models the total number of BMP’s that will be required to implement this plan. According to WV Agricultural Statistics 2012 the average farm size in Summers County is 168 acres. Since this is an average for the whole county, our model will be based on 100 acres for the Pipestem Creek Watershed to fine tune its accuracy. 100 acres squared has four sides 2,087 feet long. This model assumes that each farm has a stream requiring each side excluded from livestock and runs the length of the farm. It also assumes that three division fences the length of the farm will also be installed. The assumption for a watering system includes a pipeline the length of the farm, six water troughs and one water development. It is also assumed that 1% of all farms will require a waste storage facility and one third farms will require a stream crossing.

Table 12. BMP implementation estimates

SUB	STREAM NAME	Estimated Number of Farms to be Impacted by WBP	Estimated Exclusion Fence	Estimated Division Fence	Estimated Water Pipeline	Estimated Water Troughs	Estimated Water Development	Estimated Waste Storage Facilities	Estimated Stream Crossings
1580	Pipestem Creek	0							
1581	Pipestem Creek	1	4174	6261	2087	6	1		1
1582	Pipestem Creek	0							
1583	UNT/Pipestem Creek	1	4174	6261	2087	6	1		1

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1584	Pipestem Creek	0							
1585	Pipestem Creek	1	4174	6261	2087	6	1		1
1586	Pipestem Creek	1	4174	6261	2087	6	1		1
1587	Pipestem Creek	0							
1588	UNT/Pipestem Creek	0							
1589	UNT/Pipestem Creek	1	4174	6261	2087	6	1		1
1590	UNT/Pipestem Creek	1	4174	6261	2087	6	1	1	1
1591	UNT/Pipestem Creek	1	4174	6261	2087	6	1	1	1
Total		7	29218	43827	14609	42	7	2	7

TECHNICAL AND FINANCIAL RESOURCES

Technical Resources and Partners: The partnering state and federal agencies, and non-profit organizations may contribute a variety of services to projects associated with this plan. Some of these partners provide services with implementing conservation practices, monitoring, data evaluation, providing materials, planning assistance, general labor, etc. Their services are vital to the timely implementation of this plan allowing for faster action and more effective scheduling of Best Management Practice construction. When necessary, these contributing partners will be compensated for their expenses incurred. Partners include but may not be limited to:

West Virginia Conservation Agency (WVCA) – The WVCA will be the applicant for CWA Section 319 grants on this effort and will provide the technical assistance needed for implementation. The WVCA coordinates statewide conservation efforts to conserve natural resources, control floods, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, conserve wildlife and assist farmers with conservation practices. The WVCA Conservation Specialists (CS) will coordinate with other agencies and work directly with landowners to implement the practices called for in this watershed based plan. The WVCA CS will also conduct monitoring to track the progress of projects throughout the implementation phase of the projects. They will also produce grant proposals and status reports.

The Natural Resources Conservation Service (NRCS) – The NRCS is the federal agency that works directly with farmers for designing and installing practices. In West Virginia they work closely with the WVCA for engineering, funding, and installing BMPs. The NRCS also implements the Conservation Reserve Enhancement Program (CREP). NRCS will also seek NWQI funding as well as develop EQIP Focused Conservation Approach grants to implement agricultural best management practices.

The West Virginia Department of Environmental Protection (DEP) – The DEP is the agency with primary responsibility for protecting the environment including stream water quality. The Nonpoint Source Program (NPS) within the DEP administers the Section 319 grants and the Basin Coordinators in the program work closely with project managers to accomplish the approved watershed based plans including assistance, if needed, with monitoring. The NPS also has experience and materials for outreach, education and volunteer monitoring. The Watershed Assessment Branch (WAB) includes the programs that develop the integrated watershed report with the 303(d) lists of impaired streams, the TMDL and conduct water quality monitoring around the state. After completion of the installation of practices it will be WAB that makes the final determination if the TMDL has been fully implemented.

The Summers County Health Departments (HD) – The HD has the primary responsibility of inspecting and approving all on-site wastewater systems in their counties. The HD will have to conduct the initial survey to locate failing on-site systems. Through their contacts with homeowners the education of how to maintain an on-site system will be affected. The HD Sanitarian will have to select, inspect and approve all practices to be used in the treatment of failing septic systems.

The U.S. Fish and Wildlife Service (USF&W) – Working through their partners for fish and wildlife program, the USF&W maintain a cooperative agreement with Trout Unlimited (TU) to provide a conservation fencing crew which will install exclusion and division fence for projects at rates close to the cost share amount.

Southern Conservation District – The (SCD) provides a variety of services including education and outreach for conservation issues, technical assistance with forage, fecal, and water sampling, grassland management, and equipment rentals. The SCD also maintains an engineering and environmental consulting firm on retainer for situations when outside assistance is necessary.

Concord University – Located just beyond the boarder of the watershed, Concord University utilizes student labor for both educational and research purposes to conduct many aspects of water quality monitoring along Pipestem Creek.

Local Watershed Associations –Local non-profit citizen groups that provides education and leadership to preserve and protect the waters of their area.

Financial Resources

Clean Water Act Section 319 Grants – §319 funds are provided to the state by the US Environmental Protection Agency (EPA). In West Virginia these funds are distributed by the DEP for agencies or organizations who are conducting projects related to nonpoint source pollution.

The WVCA – provides matching funds by way of cost share and in-kind contributions for agricultural and septic practices associated with an approved Section 319 grant proposal. This match can be in the form of financial assistance for BMP's, but most often is in the form of in-kind technical assistance and staff time.

Conservation Reserve Enhancement Program (CREP) – CREP is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP addresses high-priority conservation issues in priority watersheds as designated by the NRCS State Conservationist.

Environmental Quality Incentive Program (EQIP) – EQIP is a voluntary conservation program that aids farmers who face threats to soil, water, air, and related natural resources on their land. The NRCS through EQIP offers financial and technical assistance to eligible participants to install or implement structural and management practices to promote agricultural production and optimize environmental benefits to help farmers meet environmental requirements on eligible agricultural land. At this time the EQIP program is implemented on a focus area approach. While the Pipestem Creek watershed is not included in this approach, within two years an application is planned to be submitted with the intention of addressing resource concerns that may be overlooked or not addressed in this plan.

US Fish and Wildlife Service Funds (USF&W) – Through the Partners for Fish and Wildlife Program, funding may be available to address issues related to habitat development, threatened and endangered species, and fish passage. The program also partners with Trout Unlimited to offer fence building services along riparian areas. Utilizing the partners fencing crew can provide a significant amount of non-federal in-kind match for BMP's.

The cost of technical assistance can be estimated by the value of an agency employee's time X the average amount of time spent on a project from start to finish. For agricultural projects it has been determined based on other similar projects that an average of 100 hours will be spent recruiting, planning, providing oversight for implementation, and follow up. Septic related practices require much less time as these practices do not require the project oversight and follow up. Contractors implementing them are trained and certified by the WV Bureau of Public Health. It is estimated that 10 hours of technical assistance time is spent for each septic practice. This includes two hours of administrative time and 8 hours of design time and inspection time. Agency employee's time is estimated at \$25.25 per hour. This means that the value of technical assistance time for each agricultural project is \$2,525, and for septic projects it would be \$253. It should be noted that the amount of time spent on agricultural practices will vary depending on the scope of the project determined by the conservation plan. Generally, it is seen that technical assistance time and other expenses is equal to 30% the cost to implement all agricultural practices.

Budget

The following budget estimates the total cost of the Pipestem TMDL implementation. The BMPs listed are a best estimate of the BMPs needed for enough comprehensive conservation plans and septic system improvements to reduce fecal coliform bacteria by the 37.35% called for in the TMDL.

The estimated total cost for agricultural practices is \$435,743. Much of the agricultural funds for this would come from federal sources such as EQIP and \$319 grants. The WVCA will apply for CWA 319

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funding to address the septic issues and funds for special agricultural projects that cannot fall under the cost of the watershed based plan \$1,266,243

Complete Septic System Repair	112	\$7,000	\$784,000
Septic System Pumping	57	\$500	\$28,500
Technical Assistance Cost	169	\$253	\$42,757
Total			\$855,257

Total cost in table 13 does not reflect the cost of technical assistance

Plan Budget for Agricultural Practices

Table 13. Load reduction and cost estimates for agriculture and septic rehabilitation

SWS	STREAM	Expected Load Reduction for All Practices	Estimated Cost of Septic Rehab. Practices	Estimated Cost of Exclusion Fence (\$2.82 ft)	Estimated Cost of Division Fence (\$2.82 ft)	Estimated Cost of Pipeline (\$2.45 ft)	Estimated Cost of Water Troughs (\$1642 each)	Estimated Cost of Water Development (\$10,000 each)	Estimated Cost of Waste Storage Facilities (\$10,000 Each)	Estimated Cost of Stream Crossings (\$5,000 Each)	Total Per SWS
1580	Pipestem Creek	3.98E+10	\$29,000								\$29,000
1581	Pipestem Creek	1.51E+12	\$123,500	\$11,770	\$17,656	\$5,113.15	\$9,852	\$10,000		\$5,000	\$182,891
1582	Pipestem Creek	2.39E+10	\$14,500								\$14,500
1583	UNT/ Pipestem Creek	5.12E+12	\$87,000	\$11,770	\$17,656	\$5,113.15	\$9,852	\$10,000		\$5,000	\$146,391
1584	Pipestem Creek	3.87E+10	\$29,000								\$29,000
1585	Pipestem Creek	2.58E+12	\$58,000	\$11,770	\$17,656	\$5,113	\$9,852	\$10,000		\$5,000	\$11,7391
1586	Pipestem Creek	2.63E+12	\$152,500	\$11,770	\$17,656	\$5,113	\$9,852	\$10,000		\$5,000	\$211,891
1587	Pipestem Creek	6.26E+10	\$43,500								\$43,500
1588	UNT/ Pipestem Creek	4.78E+10	\$36,000								\$36,000
1589	UNT/ Pipestem Creek	2.13E+12	\$80,000	\$11,770	\$17,656	\$5,113	\$9,852	\$10,000		\$5,000	\$139,391
1590	UNT/ Pipestem Creek	2.14E+12	\$65,000	\$11,770	\$17,656	\$5,113	\$9,852	\$10,000	\$10000	\$5,000	\$134,391
1591	UNT/ Pipestem Creek	2.65E+12	\$94,500	\$11,770	\$17,656	\$5,113	\$9,852	\$10,000	\$10000	\$5,000	\$163,891
Total			\$812,500	\$82,394	\$123,592	\$35,792	\$68,964 Agriculture total	\$70,000 \$435,743	\$20,000	\$35,000	\$1,266,243

To ensure the sustainability of the practices installed through this project, the Southern Conservation District will hold a contract requiring upkeep and maintenance with the landowners for a minimum of 5 years following the start of each practice funded by §319 funds.

Contract holders will be responsible for determining who will implement the 319 contracted BMP's on their property. Neither the WVCA, SCD, nor any other partner will dictate or provide preferential recommendations to the Contractor holder of who must conduct this work. Invoices will be paid to the contract holder as a reimbursement, not directly to any commercial vender. Invoices may be paid directly to a service provider if they are a non-commercial partner of the project (i.e. Trout Unlimited, Conservation District Crew, etc.) If the contract holder does not have the capacity to procure expenses, then the Conservation District may follow the WVCA Bidding Process to implement the project. Contractors bidding on these projects may be subject to pre-qualifications to be eligible to submit a bid. In accordance with WV State Purchasing Guidelines, contracts made with another government agency is exempt for the bidding process.

Invoices shall be submitted to the Conservation District for payment reimbursement monthly. Contract holders will provide an itemized list of qualifying matches to the Conservation District upon project completion. No checks will be sent to vendors or contract holders prior to approval by the Conservation District. Payments will not be made to contract holders for their own labor or time they put on equipment. This figure will only be used as match.

SCHEDULES AND MILESTONES

The Pipestem Creek restoration effort will be presented to the residents of the watershed in a two-way split effort divided by fecal coliform sources and program functions. Since the watershed is divided into 12 sub-watersheds, the effort will be phased in beginning with the lower 6 sub watersheds, then the upper 6. This will allow effort will begin in the areas with the most agricultural intensity for livestock and the areas where septic systems are in the closest proximity to the creek. USDA NRCS will continue to support the effort with a focus on conservation planning. Funding of these conservation plans will begin in 2020. Utilizing 319 grant funding, the WVCA will follow this with completing the conservation plan implementation and installing additional water quality improvement practices such as buffer development, fencing, and stream restoration where needed to assure no holes will be left in the conservation effort. To continue this effort, USDA NRCS will either continuing its Focused Conservation approach to the EQIP to address efforts. Participation in the effort is voluntary as there is no regulatory authority in implementing this effort.

The implementation schedule is set to coincide with the §319 grant funding cycle. After the submission of this WBP there will be periods of review, comment, editing and final approval. It is expected that the first opportunity to submit a §319 grant proposal will be in the third quarter of 2020. If approved funding should become available by the second quarter of 2020. Therefore, the implementation schedule is set to begin in the third quarter of 2010. The expectation is that 2020 and part of 2021 will be a period of introducing the residents to the effort with the first installation of BMPs not expected until the second or third quarter of 2021. Table 13 shows the expected timeframe for this restoration effort.

Table 14: Implementation Schedule

Timeline for Project Implantation									
Stream Name	Sub watershed	Stream Code	Interim Load Reduction Goal Agriculture	Interim Load Reduction Goal Septic	2020	2021	2022	2023	2024
1580	Pipestem Creek	WVKNB-1	0.00E+00	3.98E+10					
1581	Pipestem Creek	WVKNB-1	1.36E+12	1.50E+11					
1582	Pipestem Creek	WVKNB-1	0.00E+00	2.39E+10			1		
1583	UNT/Pipestem Creek	WVKNB-1-L	5.01E+12	1.06E+11					
1584	Pipestem Creek	WVKNB-1	0.00E+00	3.87E+10					
1585	Pipestem Creek	WVKNB-1	2.50E+12	7.51E+10					
1586	Pipestem Creek	WVKNB-1	2.44E+12	1.88E+11					
1587	Pipestem Creek	WVKNB-1	0.00E+00	6.26E+10					
1588	UNT/Pipestem Creek	WVKNB-1-W	0.00E+00	4.78E+10					
1589	UNT/Pipestem Creek	WVKNB-1-P	2.02E+12	1.05E+11					2
1590	UNT/Pipestem Creek	WVKNB-1-J	2.06E+12	8.08E+10					
1591	UNT/Pipestem Creek	WVKNB-1-C	2.53E+12	1.17E+11			3		

1. Expected Interim Water Quality Goal Load Reduction 1.57E+12
2. Expected Interim Water Quality Goal Load Reduction 1.42E+13
3. Expected Interim Water Quality Goal Load Reduction 1.90E+13

To measure progress towards load reduction goals, practice implementation will be tracked along with the overall livestock influenced. For each animal influenced by a conservation plan implemented, a load reduction amount found in Table 15 the practice efficiency from table 10 will be considered achieved. For failing septic practices, the load reduction will be considered achieved at the completion of the practice. Upon the completion of all agricultural practices in an associated conservation plan where stream riparian areas are developed into healthy vegetative zones, livestock manure is evenly distributed throughout the farm, and pastures and other livestock areas are managed to prevent soil erosion below the tolerable levels, the assumed load reduction will be 99% of the baseline load.

Table 15. Planned load reductions for agriculture and septics

	2020				2021				2022				2023				2024			
	Quarter				Quarter				Quarter				Quarter				Quarter			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Baseline Monitoring																				
Public Meetings																				
Contract Signing																				
Septic Replacements																				
Septic Repairs																				
Agriculture BMP's																				
Post Monitoring																				
Reporting																				

The implementation and environmental milestones estimates are based on the best professional judgement and experience from other restoration efforts. The primary focus will be on the greatest source of the contamination, where most of practices will be installed. However, the remaining sub watersheds will also be eligible for BMP installation since the entire length of Pipestem Creek is listed as impaired.

MONITORING

The responsibility for monitoring will fall primarily on the WVCA who will enlist the assistance of DEP, Concord University and any other state or federal agency as well as volunteers. The parameters to be monitored will have to fulfill the requirements of this plan and the reporting requirements of Section §319 grants reports. The parameters may include: temperature, flow, fecal coliform and any others that may be considered important. Monitoring stations will be located at the mouth of Pipestem Creek and other strategic sites to determine the success of individual projects. If other stations need to be established to locate sources or for any other reason, such as determining project success, they will be located strategically to accomplish that goal.

The timing of sampling will be up to the local project managers but should include monthly samples within a year during different flow regimes for establishing the baseline. Afterward, two a year during different seasons and after practices have been installed should provide adequate data for progress assessment. To determine if stream or stream segments have been returned to water quality standards WVCA work with WVU IWSS to implement a scale nested watershed model of sampling. The methods and location will correspond to DEP quality assurance standards and the data will be submitted to DEP.

Biological monitoring may be done as a part of the volunteer monitoring program WVSOS. The WVSOS program is an important educational tool for teaching citizens about the value of clean streams. It can also be a valuable monitoring tool. If suitable volunteer monitors are willing to sample these streams, then WVCA and DEP will facilitate their efforts. By using the WVSOS protocols a good biological assessment of the streams' conditions can be made. Another assessment will be made by WAB after project completion to determine final success or a need for further action.

To assure the data being collected is of good quality and usable for determining progress, a Quality Assurance Project Plan (QAPP) will be developed for this effort. The QAPP will be submitted to the DEP Nonpoint Source Program Coordinator for review and approval. The Coordinator will then be responsible for submitting the QAPP to EPA for review, comment and approval. The QAPP will be submitted for review at least 60 days in advance of monitoring. No monitoring for this plan will begin until the QAPP receives final approval.

For maintaining consistency with monitoring and assuring that all data collected in association with this plan, the same water quality monitoring sites will be utilized as was in the past by the WVDEP to develop the TMDL. These sites are listed in Table 16 and mapped in Figure 6.

Station ID	Mile Point	Sub ID	Stream	Code	Latitude	Longitude
KNU-00038-0.3	.3	1580	Pipestem Creek	WVKNB-1	37.6058	-80.9177
KNU-00002-0.5	.5	1589	UNT Pipestem Creek RM 5.9	WVKNB-1-P	37.5529	-80.9624
KNU-00038-7.8	7.8	1585	Pipestem Creek	WVKNB-1	37.5339	-80.9658

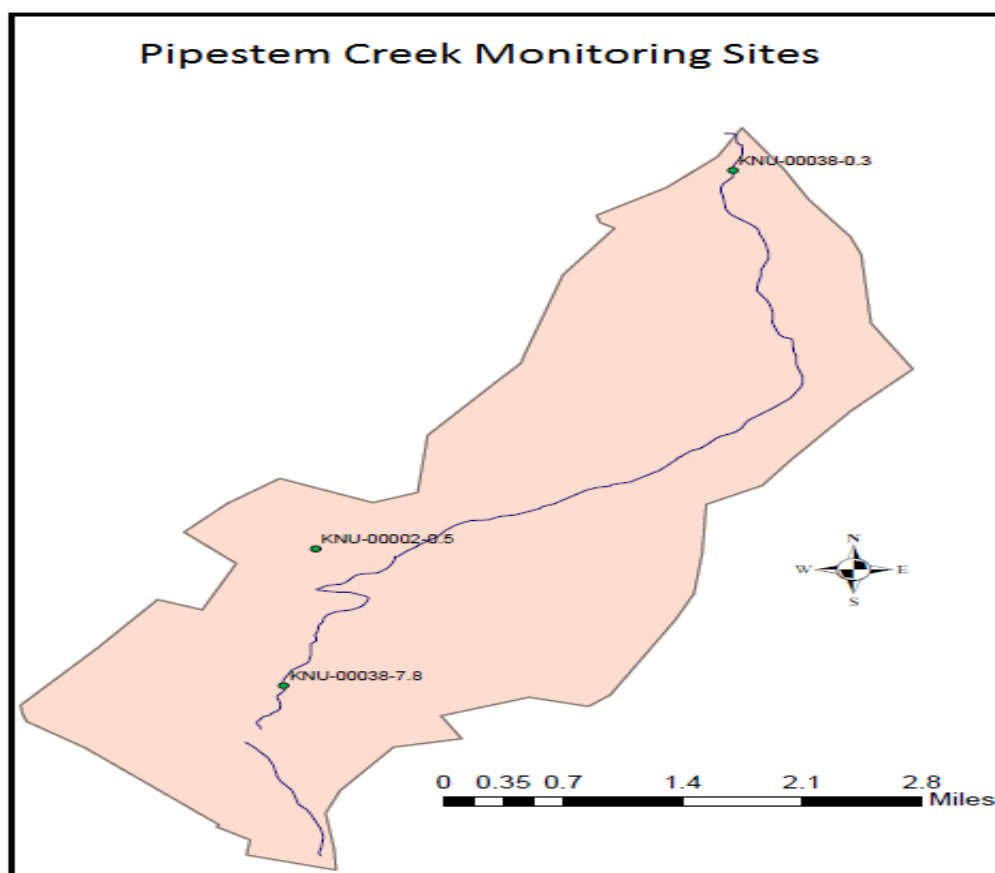


Figure 6. Map of Water Quality Monitoring Sites

INFORMATION AND EDUCATION

In any watershed restoration effort informing and educating the residents of the watershed and all other stakeholders is vital.

The stakeholders of this plan include the Southern Conservation District, West Virginia Conservation Agency, USDA Natural Resources Conservation Service, WV Department of Environmental Protection, West Virginia University Cooperative Extension Service, and the Residents and Farmers of the Pipestem Creek Watershed. In rural watersheds with a small population the most important form of that communication is done face to face. Face to face contacts between the involved agencies and landowners will be made to explain the problems and solutions. This will be conducted by the WVCA, NRCS, residents and farmers. Public meetings to announce the project, the reasons for it, and provide educational materials on agricultural best management practices and septic system maintenance will be scheduled in the watershed. The WVDEP Basin Coordinator along with WVU Extension Service and the SCD will lead this effort.

These outreach efforts will begin within a year prior to actual funding for BMP's will be available. The WVU Cooperative Extension Service and the Southern Conservation District will provide annual winter dinner meetings, and farmer and landowner workshops to include information regarding the programs and Best Management Practices associated with this plan.

The WVCA works directly with farmers to educate them to the benefits of installing BMPs which includes an explanation of the benefits of a clean and properly functioning stream. In addition, the SCD will offer field days to show farmers installed BMPs and explain how they work will be conducted.

Appendices

- A. Farmland & Fecal Coliform, Burns 2011 – Article describing how bacteria is transported and how load reductions can be achieved.
- B. Southern Conservation District Clean Water Act Section 319 Programs Standard Operating Procedures
- C. Quality Assurance Protection Plan
- D. USDA NRCS Grazing worksheets, calculations for determining pasture stocking rates
- E. Charts utilized when determining soil loss in RUSLE calculations
- F. Common Acronyms

Appendix A



Studies show buffers can reduce bacteria and protect waterways.

BY DENNIS A. BURNS

Fecal coliform transport on agricultural land can vary greatly with precipitation, livestock densities, and other environmental considerations. Various studies have discussed the effectiveness of different conservation practices for reducing fecal coliform loads on streams and subsurface water. These studies all conclude that grass buffers, along with other support practices, can result in significant load reductions. These studies also indicate that bacteria can be tied to soil particles and that soil erosion practices can also aid in reducing fecal coliform loads. This article reviews several research publications regarding the transport of bacteria in waterways and through different types of buffer systems, impacts from the lack of buffers, and overall contributions from agriculture to surface and subsurface waterways.

Fecal coliform bacteria are often declared to be an impairment requiring total maximum daily loads (TMDLs) in watersheds with heavy agricultural land use. Fecal coliform is often utilized

as an indicator according to land use of livestock presence in or near waterways or presence of failing onsite sewage treatment facilities. In order to plan for best management practices (BMPs) that will address these issues, one must first understand the organism and how it reaches our waterways.

Fecal coliform bacteria are classified in the group proteobacteria and characterized as a chemoheterotrophic proteobacteria. This includes the enteric bacteria, which inhabits the intestinal tract of animals; most enteric are rod-shaped facultative anaerobes; many are usually harmless; others are generally pathogenic, including *Salmonella*, one of the microorganisms that cause food poisoning. These bacteria absorb their nutrients from the body fluids of living hosts and will use oxygen if it is present but can also grow by fermentation in an anaerobic environment.

Fecal coliform transport through soils is affected by several factors: presence or absence of livestock, the amount of soil water available to transport fecal bacteria to the conduit waters, the storage of fecal

bacteria in the soil zone, and the rate of bacterial die-off in percolation and conduit waters. It has been shown that fecal bacteria have rapid die-off rates in natural waters, with a half-life on the order of one day or less (Pasquereil and Boyer 1994). On the other hand, microorganisms that remain in the soil aerobic zone may survive for prolonged periods of time, perhaps on the order of several months. Peak fecal bacteria concentrations have been shown to coincide with peak flow and peak sediment load in karst springs, indicating that soil attachment is an important mode of transport (Boyer and Kuczynska 2003).

Various studies have been conducted to determine the effectiveness of conservation practices' abilities to reduce fecal coliform contamination from agriculture lands. One particular study reported by Boyer in 2008 indicated a reduction of 85% to 96% of fecal coliform concentrations in excluded sinkholes located in pastureland. It was shown to be



an effective practice for reducing fecal coliforms. Another more experimental study provided evidence that fecal coliform reduction can be approximately 99% in buffers as little as 1 meter. This study utilized simulated rainfall events and manure applications (Sullivan et al. 2007). Impacts of grazing systems were observed by Sowell et al. in 2000, and it was concluded that only fecal coliform and turbidity would show significant differences between buffer types. The study demonstrated that grass buffers were more effective than forested buffers due to their additional ground cover. It even demonstrated that grazed buffers in a rotational grazing system where the buffers themselves are grazed periodically can reduce loads by 40% compared to continuously grazed systems where there is no buffer between the grazing unit and the waterway.

In 1999, Boyer described a study conducted in the Greenbrier Valley of West Virginia, comparing two dairy operations. One operation had no BMPs to control fecal contamination; the other operation included a waste storage facility to address fecal-contaminated runoff. Evaluation of sampling data from this study indicated that there

was a 99% difference between the fecal counts associated with the two operations. The dairy with the waste storage facility contributed less. Additionally, samples for this study were also taken along pastureland with no BMPs to control animal waste. The study concluded that such BMPs as rotational grazing, division fencing, animal exclusion from sinkholes, and water distribution systems for livestock are adequate for reducing fecal coliform densities. A waste management system with such practices as roofing and curbing of the loafing

one bacteria source for the stream is sediment being flushed out of the cave system that feeds the creek.

Fecal coliform can also be transported through soil without becoming tied up by soil particles. Studies have also shown that fecal coliform bacteria can be transported directly through soil strata in times of heavy rain events. In fact, Guber et al. indicated in 2005 that enhanced bacterial transport may happen in soil with well-developed macropore system as a result of intensive rainfall in a short period after manure

Grass buffers tend to be effective due to additional ground cover.

pod, a waste storage structure, and a manure and nutrient management plan can reduce the potential for affecting water quality. Additionally, in the same area, another study compared storm and seasonal distributions of fecal coliform and cryptosporidium in a spring; fecal coliform densities did not correlate positively with Cryptosporidium oocyst densities. Fecal coliform densities were greatest at storm peaks, when sediment loads were also greatest (Boyer and Kuczynska 2003).

Preliminary results indicating that fecal coliform transport in waterways is a mechanism of sedimentation has also been seen in a study being conducted along Milligan Creek in the Greenbrier Valley of West Virginia. At five sites along this stream, water samples were taken two different ways and analyzed for fecal coliform counts and turbidity (Table 1). The first sample at each site was taken at normal water flow and turbidity. The second sample at each site was altered. Sediment from the bottom of the stream was kicked up into suspension while the sample was being taken. The purpose of this experiment was to determine if sediment could be the source of bacterial contamination in this stream. In all five samples, a significant increase in turbidity demonstrated a significant increase in fecal coliform counts for that site, consistent with the findings of Boyer and Kuczynska in 2003. While Milligan Creek is a large karst window that sinks and rises several times, it can be speculated that

application. Macropores have equivalent diameters $d > 30\mu$. They provide the main drainage pathway during heavy rainfall events. These pathogens can become entrapped in the macropores, clogging them and altering their pore geometry (Buchan and Flury 2004). This is further evidence that bacteria can become tied up by the soil system and that erosion prevention practices can be an effective measure in reducing the overall fecal coliform load of a watershed.

Soupir in 2006 reported on a study that concluded that grass filter strips were not as effective at removing bacteria as they are at removing sediment. The study continues to say that practices that reduce the first-flush effects, such as detention basins, could more effectively reduce bacteria transport. These practices reduce water flow and allow it to infiltrate into the soil before it reaches surface waterways.

Discussion

The referenced studies all indicate that fecal coliform bacteria can be significantly reduced by implementing BMPs. In all instances the BMP that accomplishes this is a vegetative grass buffer or filter strip and additional support practices that work with the buffer in a conservation system, such as a livestock watering system or a detention basin. The BMP works by reducing water velocity of overland flow, capturing bacteria-laden sediment and allowing stormwater to infiltrate into the soil before it can reach a surface water conduit. While one study

Table 1.
Water Quality Associated With
Milligan Creek Study

Site	Fecal	Turbid	% Increase	
			Fecal	Turbid
1 Normal	745	16.25		
1 Altered	2,700	56.5	282	351
2 Normal	38	42		
2 Altered	1,500	56.4	1,247	134
3 Normal	1,000	1		
3 Altered	3,900	36.45	139	5,645
4 Normal	791	3.2		
4 Altered	891	27.6	113	853
5 Normal	300	1		
5 Altered	636	56.2	177	3,620
Average % Increase			932	2,523

indicates that this can be accomplished with as little as a 1-meter-wide buffer, a more in-depth study indicates that on slopes of 2% to 20%, a 6-meter buffer is usually adequate to accomplish this goal (Hook 2003). These studies also indicate that, depending on the overall load in the watershed, there should be a correlation between bacteria counts and stream turbidity, because bacteria levels increase with peak flow and turbidity. This correlation could only be calculated on an individual watershed basis and would require soil, water, and sediment analysis to determine the actual load associated with the watershed.

Another important factor in the development of an agricultural system to address bacteria loads is the implementation of support practices. Such practices as alternative watering systems, grazing systems, and walkways prevent pressure on a buffer or the area near the buffer. Livestock are then forced to distribute manure throughout the grazing area when watering occurs at areas farther away, when they walk through nonsensitive areas, or when they loaf in areas with reduced runoff. In fact, the EPA-approved Watershed Based Plan for Second Creek in West Virginia references the Chesapeake Bay Model, which indicates a 90% load reduction by implementing a rotational grazing system in conjunction with an offsite watering system (Burns 2009). This is a 50% increase in load reduction over what was reported by Sovell in 2000 for rotational grazing systems over a continuous grazing in which the riparian area is grazed in both situations.

Conclusion

Fecal coliform bacteria are transported primarily by being tied to sedi-

ment, which is washed into waterways through erosion. To manage land and reduce contamination, the following factors should be considered:

- Implement BMPs that reduce first-flush effects by slowing stormwater velocity and allowing sediment to fall out of suspension into a vegetated area before it reaches a waterway. Such BMPs could include detention basins, water bars, sodding, terracing, diversions, and vegetative buffers.

Depending on the overall load in the watershed, there should be a correlation between bacteria counts and stream turbidity, because bacteria levels increase with peak flow and turbidity.

- Where possible, develop BMPs that allow stormwater to infiltrate into soil strata and only reach waterways by subliminal flow. Such BMPs could include infiltration basins (rain gardens), compost sponge, sub-soiling, and vegetative buffers. These practices should also be maintained frequently, depending on the overall bacteria load, to prevent clogging of micropores.
- Buffer widths should be determined on a case-by-case basis with several considerations: (1) Consider the area it is buffering; what will be the sediment and stormwater discharge load the buffer will need to address? (2) Consider the environmental considerations; what is the rainfall, slope, and other runoff factors for both the buffer itself and the area it is buff-

ering as well as additional stresses on the buffer? (3) What other support management practices can be installed to prevent stress and additional load on the buffer? The final buffer width should be adequate to prevent any overland flow from reaching the waterway, and allow the majority if not all sediment to fall out in the vegetative area.

- Develop grazing systems that force livestock to spread their manure throughout the grazing unit to pre-

vent concentrated manure in one area. Concentrated manure combined with trampled vegetation and compacted soils from heavy livestock use create an area prime for mass erosion during heavy rain events.

- On karst topography, prevent eroded material and contaminated stormwater from reaching open sinkholes. The cave environment is conducive to bacteria viability and will allow it to be flushed out into a surface waterway over time.
- While implementing BMPs that aid in reducing the overall load on a watershed, it may take a considerable amount of time for the stream to show reductions, depending on how much bacteria-laden sediment is built up in the streambed or cave system. In the short term, overall load reductions can be estimated as shown in Table 2 if the overall load has been determined.
- When possible, if the goal of a conservation plan is to address fecal coliform loads of a watershed, plans should be developed to the resource management system level to achieve the maximum possible load reduction. A resource management system addresses all natural resources concerns that pertain to plants, soil, water, animals, and air (NRCS Field Office Technical Guide). **EE**

Conservation Practice	Expected Bacteria Load Reduction
Livestock exclusion	25%
Buffer	55%
Buffer with first-flush prevention	75%
Alternative watering system, continuous grazing	50%
Alternative watering system, rotational grazing	70%
Livestock waste storage facility	90%
Fully implemented resource management system	99%

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Learn more about this topic:

www.ErosionControl.com/vegetation-management

SCD Clean Water Act Section §319 Programs

Standard Operating Procedures

Month XX, 20XX



This document will serve as a standard operating procedure for implement Clean Water Act Section 319 programs in the Southern Conservation District. It should be considered a living document and may be edited and updated as needed to comply with the overall federal program with the approval of the Southern Conservation District and the West Virginia Conservation Agency

Approvals: _____ Date: _____

Southern Conservation District Representative

_____ Date: _____

WVCA Representative

This program is authorized by the Federal Water Pollution Control Act, i.e. the “Clean Water Act”, as amended through P.L. 107-303, November 27, 2002. Within this legislation, beginning on page 173, Sec. 319 Nonpoint Source Management Programs are authorized. In general, this section mandates that states identify waters that are impaired for nonpoint source pollutants and develop programs to alleviate the issues. In Sec. 319 (b4) states that’s these programs are to be implemented on a watershed-by-watershed basis within the state. Funding for these programs are authorized under sec. 319 (h) of this act, Grants for Implementation of Management Programs.

Keeping this law in mind, all watershed projects begin with the TMDL (Total Maximum Daily Load), the document produced by the state indicating impaired waters and their pollutant. The TMDL also indicates the level of pollutant that needs to be reduced and the suspected sources. After reviewing this document, Watershed Based Plans are developed. These plans take the information from the TMDL and determine the mode of action that needs to be taken to reduce the nonpoint source pollutants to state acceptable levels. They prescribe and project the number of BMP’s (Best Management Practices) that will be necessary as well as a projected cost to implement. If a TMDL is not available for an area, a Watershed Protection Plan can be developed.

Finally, grants are written for funding to implement the Watershed Based Plan or Watershed Protection Plan. These grants typically should focus on a smaller basin within the watershed to target specific resource concerns and assure reductions of pollution loads. Grants range from \$20,000 to \$200,000 depending on the scope of the project and may last from 3 to 5 years once funded. Funding originates with the U.S. Environmental Protection Agency and is sent to WV through the WV Department of Environmental Protection. Once the WV DEP awards these grants to the WVCA, they can then be requested for by the Conservation District. All grant cycles are allocated based on the federal fiscal year and must be completed no later than August 30, of the year it expires.

Occasionally, funding for these grants can be provided that originate as left over funds from un-expired grants. These grants typically have less funding and shorter time frames to implement.

After grant funding is provided to a Conservation District, it is administered in the following manner:

- I. Eligible Projects
 - a. Sites must pose a water quality concern that contributes to the impairment(s) listed in the TMDL
 - b. A load reduction of the listed impairment must be obtained by each project
 - c. Agricultural sites must currently contain livestock that are creating the resource concern or have had livestock creating a resource concern at the time the TMDL sampling was conducted and have an intent to re-introduce livestock into the area.
 - d. Nutrient Management Plans are required for projects
 - e. Projects must include practices that exclude or significantly reduce exposure of livestock or other impairment causing agent to the adjacent water quality resource of concern.
 - f. In an agricultural situation, livestock may graze the buffer area provided that additional setback of fencing is provided, an alternative watering source is located on the outer edge of the buffer and the USDA NRCS standard for Riparian Grazing is followed.

- g. All projects must be reportable to a 319-base grant milestone, 319 watershed incremental project grant, or 319 AGO grant.
- II. Outreach – Outreach may consist of a variety of situations intended to improve and spread the word about the 319 program and non-point source pollution prevention. Situations may include but not be limited to:
- a. Farm field days and pasture walks
 - b. Farm tours
 - c. Dinner meetings
 - d. Workshops
 - e. Developing and distributing printed materials

Partnering with other agencies and events such as WVU Extension Service’s dinner meeting series, SCD Conservation Farm Tour and Banquet, and NRCS trainings may also occur providing a non-point source pollution prevention aspect is discussed.

III. Eligible Practices

All practices implemented must follow USDA NRCS Standards and Specifications, WV DEP Erosion and Sediment Control Handbook, or be otherwise approved by an engineer. Additionally, some practices may have some program requirements specific to the WVCA, these requirements are listed below each practice in the following list.

- a. Stream Exclusion Fence (Specific WVCA Requirements)
 - i. Shall be an average of 35 feet from the ordinary high-water mark of the adjacent stream or water body
- b. Woodland Exclusion Fence (Specific WVCA Requirements)
 - i. Only eligible if there is a water quality resource concern that contributes to the TMDL listed impairments located in the adjacent woodland
- c. Pasture Division Fence (Specific WVCA Requirements)
 - i. Only eligible when a prescribed grazing plan is being developed
- d. Alternative Livestock Water Development (Specific WVCA Requirements)

Any water system developed through this program that is determined to appropriate flow and storage capacity will be equipped with an emergency access point that can be used in the event of a drought or for fire suppression.

 - i. Pond (Specific WVCA Requirements)
 - 1. Must be fenced with a minimum average of 35 feet from the edge or the high-water mark.
 - 2. Contract holders will be encouraged to install a dry hydrant for emergency water usage, if this is not approved for payment within a 319 grant, then the contract holder would have to provide at their own expense.
 - ii. Spring (Specific WVCA Requirements)
 - 1. Must be fenced to exclude livestock
 - iii. Well
 - iv. Water Pumping Facility (Specific WVCA Requirements)

- 1. May utilize convention or alternative energy sources
 - v. Pipeline
 - vi. Reservoir
 - vii. Water Trough
 - e. Stream Crossing
 - f. Heavy Use Area Protection
 - g. Roofed Feeding and Waste Storage Facility (Specific WVCA Requirements)
 - i. Only available when livestock are being feed near the adjacent stream creating direct runoff and erosion from an un-vegetated riparian area
 - ii. The adjacent stream must contain a 35-foot buffer
 - iii. A nutrient management plan must be developed and followed
 - iv. Facilities will be inspected two times per year for 5 years to assure that they are being utilized for their intended purpose
 - h. Waste Storage Facility
 - i. Tree Planting
 - j. Buffer Development
 - k. Grass Waterways
 - l. Nutrient Management Plan (Precision and/or Comprehensive)
 - m. Prescribed Grazing Plan
 - n. Prescribed Winter Feeding Plan
 - o. Temporary Erosion and Sediment Control Practices
 - p. Stormwater Control Practices
 - q. Rain Garden
 - r. Constructed Stormwater Wetland
 - s. Bioengineering Practices
 - t. Natural Stream Restoration Practices
 - u. Septic System Pumping
 - v. Septic System Repair
- IV. Conservation Plan Development
- a. A Conservation Plan must be written for a contract to be developed. Plans must include but may not be limited to:
 - i. Site maps – topo maps and aerial photo’s including boundaries, fields and acreages, existing and planned practices, nutrient application, soils, cropping, etc.
 - ii. List of resource concerns – includes subjects of degradation for soil, water, plants, animals, and air
 - iii. Goals – Plans for utilizing the land resources to produce agricultural products and preserve soil and water resources
 - iv. Cultural resources – historical locations of concern such as cemeteries, structures, markers, battlefields, etc.
 - v. Documented absents or presents of threated and/or endangered species – see U.S. Fish and Wildlife Service for full list and suspected locations

- vi. Existing Conditions – Attributes of the farm that are leading to the resource concerns
- vii. Grazing Calculations – mathematical equations accounting for forage availability, livestock attributes, and rotation efficiency to determine livestock stocking density
- viii. Contingency Plans – a set of criteria for adjusting the conservation plan in the event of winter, drought, mud, mortality, and bio-security events.
- ix. Nutrient Management Plan – considers nutrient availability, and assures the production goals are met without over applying outside nutrients for fertilizer or manures
- x. List of Conservation Practices – All practices planned to be implemented to address the resource concerns
- xi. Alternatives – practices that may be implemented if a planned practice is later determined not feasible
- xii. Planning Assistance Notes – record of landowner and planner decisions, conservations, and correspondence
- xiii. Survey Data and Design Sheets - modeled land features showing site contour, elevation, and geographic position utilized to develop the final design of practices
- xiv. NEPA Documents – National Environmental Policy Act, sometimes required for projects utilizing federal funding.

V. Contract Development

- a. A 319 contract will require minimum of a 5-year commitment
- b. Practices must be started within 6 months and completed within 12 months of Conservation District approval
- c. A 319 contract will include:
 - i. List of all practices intended to be implemented with 319 funds and an estimated cost
 - ii. List of all practices intended to be implemented as match and an estimated cost
 - iii. List of all other in-kind sources of match
- d. All cost figures are considered estimates that may need to be amended
- e. 319 funds will consist of no more that 60% of the contract total
- f. An estimated cost of environmental impact (i.e. cost/benefit) figure will be listed on each contract to assure that the contract is allocating funds appropriately
 - i. The cost of the contract may exceed the cost of environmental impact by no more than 20%
 - ii. Value of environmental impact is calculated by: (Soil Value) +(Nutrient & Bacteria Value)*Contract Length
- g. A landowner may implement projects under contract themselves or utilize a contractor. If a landowner implements the project themselves, they need to contact a WVCA representative for oversight. If they choose to utilize a contractor, the contractor may be required to present pre-qualifications prior to starting the project.

VI. Eligible Match

- a. No item funded with federal monies can be utilized as match for a 319 project
- b. Match must constitute a minimum of 40% of any contracts total funds
- c. Items associated with match must also be considered eligible for 319 federal funding
- d. WVCA time spent on the project billed at the actual cost to the state per hour
- e. Mileage on WVCA vehicles billed at the current state mileage reimbursement rate
- f. Landowner and/or their representative's time spent on the project billed at current prevailing wage
- g. Cash money paid for by the landowner/contract holder going toward the project that is not reimbursed for (Example: if the contract will only pay up to \$3.50 per foot towards fence and the total cost is \$5.00 per foot, then \$1.50 per foot will be utilized as match)
- h. Materials provided by the contract holder, billed at current market value
- i. State funds
- j. Excess match from other contracts within the same TMDL area
- k. Project Maintenance over the course of the contract

VII. Purchasing, Contracting, and Processing Payments

- a. Landowners/contract holders are responsible for determining who will implement the 319 contracted BMP's on their property. Neither the WVCA, SCD, nor any other partner will dictate or provide preferential recommendations to the Landowner/contractor holder of who must conduct this work.
- b. Landowners/contract holders will be made aware that it can take up to 45 days to be reimbursed for payments.
- c. Invoices will be paid to the contract holder as a reimbursement, not directly to any commercial vender.
- d. Invoices may be paid directly to the vendor if they are a non-commercial partner of the project (i.e. Trout Unlimited, Conservation District Crew, etc.)
- e. Any materials purchased directly at a vender through a GVCD account will require a WVCA purchase request and approval.
- f. If the contract holder does not have the capacity to procure expenses, then the Conservation District may follow the WVCA Bidding Process to implement the project. Contractors bidding on these projects may be subject to pre-qualifications to be eligible to submit a bid.
- g. In accordance with WV State Purchasing Guidelines, contracts made with another government agency is exempt for the bidding process
- h. Invoices shall be submitted to the Conservation District payment or reimbursement monthly.
- i. An itemized list of matches shall be submitted to the Conservation District upon project completion
- j. Invoices will be processed by the WVCA Conservation Specialists assigned to the project, then forwarded to WVCA District Fiscal Operations Staff for auditing and accounting purposes, WVCA district Fiscal Operations Staff will then notify the WVCA District manager when a payment is approved for check printing. No checks will be sent to vendors or contract holders prior to approval by the Conservation District.

- k. Invoices listed on board meeting agendas will be brought to the Conservation District 319 committee for discussion prior to the Conservation District monthly board meeting.
- l. Payments will not be made to contract holders for their own labor or time they put on equipment. This figure will only be used as match.

VIII. Finishing Projects and Closing out Contracts

- a. Final inspection shall be made by the WVCA to assure that all practices are implemented correctly
- b. Annual monitoring will be conducted to assess the overall success of the project and impact to the intended water quality
- c. Under the circumstances of a weather event that is out of the control of the contractor holder or the WVCA where as a practice is damaged or destroyed and funds are available, the WVCA/ Conservation District may bear the cost to construct.

IX. Day to Day Operations Specific to the SCD

- a. The nonpoint source program in the SCD will be operated by one WVCA Conservation Specialist. While these individuals will have specific areas of focus within the program, it is to be understood that they will work together as a team to assure that project goals and objectives are accomplished.
 - i. **Conservation Specialists #1** will focus efforts on: conservation planning, monitoring budgets, processing invoices, monitoring, surveying, data collection, project implantation, monitoring contractors, and Agricultural Enhancement
- b. All invoices, new contracts, contract revisions, letters of request to the WVCA for funding, grant proposals, and watershed based plans will be presented to the SCD board of supervisors at their bimonthly 319 committee meeting
- c. The nonpoint source program will try to incorporate other program funding sources into the same project. This will help complete large projects and extend funds. Other funding sources will include USDA programs such as the Conservation Reserve Enhancement Program (CREP) Environmental Quality Insensitive Program (EQIP), and the WVCA's Agricultural Enhancement Program (AEP). When applicable, AEP funds will be used as match.
- d. Regardless of their location within the watershed, WVCA Conservation Specialist will be available to provide technical assistance to landowners regarding soil and water conservation issues, provide technical assistance to landowners with stream bank erosion and stabilization issues, review and assist developers and contractors with construction erosion and sediment control plans, provide technical assistance and planning to address stormwater control, and develop educational programs related to water quality. This is authorized and reportable to the WVCA 319 Base Grant.
- e. When determining watersheds for Based plan or Protection plan development, the following criteria must exist:
 - i. Multiple land users have expressed interest in participating.
 - ii. Partnering agencies and/or organizations have expressed interest in assisting
 - iii. A high degree of success is expected
 - iv. The plan will undertake the entire watershed

- v. The SCD request the plan be developed
- f. The WVCA Conservation Specialists will work cooperatively with other agencies and organizations including but not limited to USDA Natural Resources Conservation Service, USDA Farm Service Agency, US Fish and Wildlife Service, WV Department of Environmental Protection, WV Department of Natural Resources, WV Department of Highways, WVU Extension Service, Local County and City governments, Local Watershed Associations, Farmer organizations, and other Non-Governmental conservation and wildlife organizations. These partnerships assure that projects are completed with the overall goals of the 319-program in mind. This is authorized and reportable to the WVCA 319 Base Grant.
- g. The WVCA recognizes the benefits of GVCD technical staff helping the 319-program accomplish its goals by promoting the program and recruiting participants as a part of their day to day duties. For this reason, the WVCA Conservation Specialists will work closely with GVCD technical staff to make sure they are provided with in-house training and resources as available to be proficient at their duties.

X. SOP Appendix
 a. Site Evaluation Form

Landowner Name		
Watershed		
Location	Lat:	Lon:
Number and Type of Livestock		
Describe Resource Concern		
Practices needed:		

b. Maximum Practice Cost Share Rates.

This cost list was developed from the actual cost of other 319 projects. Other cost figures from the USDA NRCS practice schedule, and the USDA FSA CREP were also used.

Practice	Cost Estimate
Stream Exclusion Fence	\$3.50 per foot
Woodland Exclusion Fence	\$3.50 per foot
Pasture Division Fence	\$3.50 per foot
Pond	\$10,000 each
Spring	\$1,000 each
Well	\$10,000 each
Water Pumping Facility	\$10,000 each
Pipeline	\$3.50 per foot
Water Trough	\$1,000 each
Water Reservoir	\$1 per gal
Stream Crossing	\$1,500 each
Heavy Use Area Protection	\$1.80 per sq./ft.
Buffer Development	\$700 per acre
Grass Waterways	\$0.05 sq./ft.
Roofed Feeding and Waste Storage Facility	\$15 per Sq./ft.
Waste Storage Facility	\$10 per Sq./ft.
Tree Planting	\$111 per acre
Nutrient Management Plan	\$2,774 per acre
Nutrient Management Plan Precision	\$10 acre
Prescribed Grazing Plan	\$4,772 per acre
Prescribed Winter Feeding Plan	\$2,774 per acre

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

Temporary Erosion and Sediment Control Practices	\$3,150 per acre
Stormwater Control Practices	\$3,150 per acre
Rain Garden	\$46.86 Sq./ft.
Constructed Stormwater Wetland	\$2.20 per Sq./ft.
Bioengineering Practices	\$118 per ft.
Natural Stream Restoration Practices	\$118 per ft.
Septic System Pumping	\$250 each
Septic System Repair	\$5,000 each
Boundary Fence (not an eligible practice)	\$0.00
Pasture Seeding (not an eligible practice)	\$0.00
Fertilizer Application (not an eligible practice)	\$0.00
Lime Application (not an eligible practice)	\$0.00
Invasive Species Control (not an eligible practice)	\$0.00

For calculating a landowner’s in-kind labor match, figures from the WV Secretary of State Privileging Rule will be used.

REGION 1 (WORKFORCE INVESTMENT AREA 1)			
Job Title	Code	Wage	Fringe
ASBESTOS ABATEMENT WORKER	47-4041	21.21	12.93
ASBESTOS INSULATOR - FIRE STOP TECHNICIAN	47-2132	32.65	13.27
BOILERMAKER	47-2011	34.12	23.22
BRICKLAYER-STONEMASON-TILE - MARBLE SETTER	47-2021	35.57	13.18
CARPENTER	47-2031	28.77	15.86
CEMENT MASON - PLASTERER - STUCCO MASON	47-2051	28.05	13.71
DIVER	49-9092	25.09	10.20
DREDGER	53-7031	26.96	10.96
ELECTRICIAN	47-2111	27.49	8.77
ELEVATOR CONSTRUCTOR - MECHANIC	47-4021	27.21	11.06
GLAZIER	47-2121	25.76	7.14
HEAVY EQUIPMENT OPERATOR - GROUP 1	47-2073	28.87	13.44
HEAVY EQUIPMENT OPERATOR - GROUP 2	53-7091	30.28	14.26
INSULATION WORKER	47-2131	30.84	20.73
IRONWORKER	47-2221	33.34	10.93
LABORER - HELPER	47-2061	25.70	11.38
LATHER - CEILING - DRYWALL INSTALLER	47-2081	29.18	16.52
MECHANIC	49-3042	27.53	10.30
PAINTER	47-2141	26.36	12.93
PLUMBER - PIPEFITTER	47-2152	31.65	15.25
POWER-LINE CONSTRUCTOR	49-9051	35.67	12.36
ROOFER	47-2181	27.83	12.71
SHEET METAL WORKER	47-2211	27.21	16.15
SOFT FLOOR LAYER	47-2041	29.32	17.37
STRIPER OPERATOR – HIGHWAY and PARKING LOT	47-4051	13.68	5.56
TELECOMMUNICATION INSTALLER	49-2022	25.12	10.21
TRUCK DRIVER- HEAVY & TRACTOR-TRAILER	53-3032	23.27	10.67
TRUCK DRIVER- LIGHT TRUCK & FORKLIFT OPERATOR	53-3033	20.36	8.65

Region 1 (Workforce Investment Area 1): Fayette, Greenbrier, McDowell, Mercer, Monroe, Nicholas, Pocahontas, Raleigh, Summers, Webster, Wyoming.

For calculating a landowner’s in-kind equipment usage match, the FY 2017 USDA Farm Service Agency WV ECP Program Equipment Rates will be used

Tractor with Loader and Attachments			Backhoe	Bulldozer				Excavator					Truck		
>10 hp	<30 hp	ATV		55-89 hp	90-129 hp	130-165 hp	166+ hp	<30 hp	30-54 hp	55-89 hp	90-129 hp	130-165 hp	Dump Single Axel	Tandem Rear dump	Pickup
\$51	\$27	\$24	\$52	\$68	\$79	\$93	146	\$35	\$53	\$75	\$92	\$115	\$46	\$75	\$25

Hp –horse power

c. Conservation Plan Checklists

		Present (Y or N)
Operators Goals		
Resource Concerns		
Existing Conditions	Ecological Site Description	
	Waste handling and storage	
	Watering system and fencing	
	Existing practices	
Grazing Calculations	How Many Acres are Needed	
	How Many Animals Can be Supported	
	Continuous Grazing	
	Days of stockpiled forage	
Maps	Soil Map	
	Topo Map	
	Boundaries Map	
	Practice Plan Map	
Contingency Plan	Winter	
	Drought	
	Mud	
	Mortality	
	Bio-Security	
Nutrient Management	Field ID, with Acreages	
	Soil Descriptions	
	Soil Sample Results	
	GIS Maps documenting fields	

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

	Land Treatment	
List of Conservation Practices	Planned Practices	
	Implementation Schedule	
	Estimated Cost	
Planning Assistance Notes		
Survey Data		
Design Sheets		
Documented absents or presents of threated and/or endangered species		
Cultural Resources Inventory		
NEPA Documents if Applicable		

d. Final Inspection Checklists

Project Name			
Location			
Inspection Date			
Inspector			
Practices	Was the Practice Installed Appropriately	Is the Practice Completed	Was the Contract Holder Present at Inspection
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

9.			
10.			
Notes/Recommendations			

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

CONTRACT AGREEMENT FOR THE WVCA Clean Water Act Section 319 (h)																										
WATER QUALITY IMPROVEMENT PROGRAM																										
Save Page to PDF																										
Participant Name:																										
Address:																										
Phone Number:				USDA Farm #		Tract #																				
County:				Watershed:																						
In agreement with : SOUTHERN Conservation District to receive a 60 percent cost share on installation of the following practices for my farming operation:																										
319 Funds						Total Est.																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Practice</th> <th style="width: 10%;">Amount</th> <th style="width: 10%;">Unit</th> <th style="width: 15%;">Cost Per Unit</th> <th style="width: 15%;">Cost</th> </tr> </thead> <tbody> <tr> <td>Practice 1</td> <td></td> <td></td> <td style="text-align: right;">\$0.00</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Practice 2</td> <td></td> <td></td> <td style="text-align: right;">\$0.00</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Practice 3</td> <td></td> <td></td> <td style="text-align: right;">\$0.00</td> <td style="text-align: right;">\$0.00</td> </tr> </tbody> </table>							Practice	Amount	Unit	Cost Per Unit	Cost	Practice 1			\$0.00	\$0.00	Practice 2			\$0.00	\$0.00	Practice 3			\$0.00	\$0.00
Practice	Amount	Unit	Cost Per Unit	Cost																						
Practice 1			\$0.00	\$0.00																						
Practice 2			\$0.00	\$0.00																						
Practice 3			\$0.00	\$0.00																						
Special Condition Note:																										
Total 319 Funds																										
Match (Non-Federal Funds and/or In-Kind Contributions)																										
1	WVCA Time and Mileage				\$0																					
2	Landowner Cash or In Kind				\$0																					
3	Grazing Plan				0																					
4	Nutrient Management Plan				\$0																					
5	Other																									
Total Match					\$0																					
Required Match					\$0																					
Total Contract						\$0																				
Estimated Value of Environmental Impact			\$0.00																							
Expected Bacteria Load Reduction			0.00E+00 counts/Year																							
Expected Soil Loss Reduction			0 Tons/Year																							
Expected P Reduction			0 Lbs per Year																							
Expected N Reduction			0 Lbs per Year																							

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

Upon entering into this contract, I agree to the following stipulations and agree to the attached conservation plan developed for my operation, which is hereby made a part of this contract.

Stipulations:

*Practices will be carried out on the property listed above with the listed farm and tract number from the USDA Farm Service Agency, and in accordance with the attached conservation plan which is hereby made a part of this contract.

*Practices will be maintained for a minimum of 5 years following installation.

*Practices will be completed within 1 year of signing this agreement.

*Practices will be installed and planned in accordance to the USDA NRCS standards and specifications as outlined in the USDA NRCS Field Office Technical Guide or the West Virginia Erosion and Sediment Control Best Management Practices Manual.

*The Southern Conservation District, West Virginia Conservation Agency, West Virginia Department of Environmental Protection, USDA Natural Resources Conservation Service, and U.S. Environmental Protection Agency has the right to enter the property when necessary to monitor the practices installed under this contract.

*Upon certification, I will provide an original copy of bills associated with the practices installed or unit thereof for payment to the Southern Conservation District for reimbursement of the approved amount

*Participant will forfeit all rights to further payments or grants under the contract and refund to the conservation district all payments or grants received hereunder upon violation of the contract as shown in Attachment A which is hereby made a part of this contract, at any stage during the time the participant has control of land if the conservation district determines that such a violation is of a nature as to warrant termination of the contract or to make refunds or accept such payment adjustments as the conservation district may deem appropriate if he determines that the participant's violation does not warrant termination of the contract

*As necessary, this contract may be amended by the WVCA Conservation Specialist providing no additional funds are added to the approved cost. If additional funds need to be added, approval will come from the conservation district

*Any residual funds obligated for this project will remain in the Southern Conservation District to be used for:

0

Signature(s) _____ Date _____									
Applicant (landowner or lease holder)									
Signature _____ Date _____									
Southern Conservation District Supervisor									

Long-Term Contract			
For 319 Agricultural Best Management Practices (BMP's)			
Part I - Participant(s)			
1	Name:		
2	Name:		
Contract Period:		From: 	To:
Part II - Terms and Conditions			
<p>Each of the undersigned and above named participants hereby agrees to participate in this 319 Agriculture BMPs Project and by his/her participation agrees to all of the provisions of this contract: (1) to carry out on the land unit as shown in Part 1 hereof, land adjustments, streambank management and conservation practices in conformity with and as shown in the attached plan/schedule of operations, which is hereby made a part of this contract, according to the time schedule noted and in accordance with the conservation treatment and specifications and other special program criteria obtained from the local field office of the West Virginia Conservation Agency, (2) to forfeit all rights to further payments or grants under the contract as shown in Attachment A which is hereby made a part of this contract, at any stage during the time that the participant has control of the land if the conservation district that such a violation is of a nature as to warrant termination of the contract or to make refunds or accept such payment adjustments as the conservation district may deem appropriate if he determines that the participant's violation does not warrant termination of the contract, (3) upon transfer of the participant's right and interest in the land during the contract period to forfeit all rights to further payments or grants under the contract and refund the conservation district all payments and grants received thereunder unless the transferee of the land agrees with the conservation district to assume all obligations of the contract, (4) special provisions are included and are hereby made a part of this contract, (5) all practices in the plan/schedule of operations will be maintained for the life of the practice, and (6) cost-share payments will be reported to the IRS as income and could result in my/our taxable obligations to the IRS</p>			
Part III - Participant(s) Signature(s)			
(1) Signature for tax purposes		(3) Social Security No. or Tax ID No.	
(2) Signature		WVCA Conservation Specialist	
Part IV-Approval			
By:			
Name	Chairperson		
Southern	Conservation District	Date	

Attachment A

Attachment A: §319 Incremental Watershed Project Contract

1 Definitions

The following definitions are applicable to the 319 incremental watershed project contracts.

- A. 319 contract means the long term contract for 319 cost share program documents including the applicable contract appendix, conservation plan, entered between the conservation district (CD) and the participant. Such contract shall set forth the terms and conditions for participation in the 319 project and receipt of 319 payments
- B. Conservation Plan of Operations (CPO) means a record of a participant's decision, and supporting information, for treatment of a unit of land or water and includes the schedule of operations, activities, and estimated expenditures needed to solve identified natural resource concerns.
- C. Comprehensive Nutrient Management Plan means a plan for the farmer to manage the amount, form, placement and timing of applications of plant nutrients. CNMP's will address water quality criteria for the feed production and area, and land on which the manure and organic by-products will be applied. CNMP will address soil erosion to reduce transport of nutrients within or off of a field to which manure is applied.
- D. Conservation Practice means a specified treatment, such as a structural or vegetative practice or land management practice, which is planned and applied according to NRCS standards and specifications and as a part of a conservation management system (CMS)
- E. Structural Practice means a conservation practice which primarily involves the establishment, construction, or installation of a site-specific measure to conserve, protect from degradation, or improve soil, water or related natural resources in the most cost-effective manner. Examples include but are not limited to, stabilized stream crossings, fencing, livestock water development, and stream corridor restoration.
- F. Land Management Practice means conservation practices that primarily require site-specific management techniques and methods to conserve, protect from degradation, or improve soil, water or related natural resources in the most cost effective manner. Land management practices include but not limited to nutrient management, manure management, and grazing management.
- G. Vegetative Practice means conservation practices that primarily involve the establishment or planting of a site-specific vegetative measure to conserve, protect from degradation, or improve soil, water or related natural resource in the most cost-effective manner. Examples include, but are not limited to riparian plantings, filter strips, and critical area plantings.
- H. Conservation Management System means any combination of conservation practices and land management practices that, if applied, will protect or improves the soil, water or related resources. A CMS may treat one or all of the natural resources to the sustainable level, or to a greater or lesser extent than the sustainable level.
- I. Cost Share Payment means the financial assistance from the CD to the participant to share the cost of installing a structural or vegetative practice

- J. Unit of Concern means a parcel of agricultural land that has natural resource conditions that are a concern to the participant as outlined in the conservation plan.
- K. Technical Assistance means the personnel and support resources needed to conduct conservation planning; conservation practice survey, layout, design, installation, and certification; training, certification, and provide quality assurance for professional conservationist; and evaluation and assessment of the program.

2. Eligibility Requirements

- A. By signing the 319 contract, the participant certifies that such participant will control the land subject to the contract for the contract period and shall, upon demand, provide evidence to the CD demonstrating that such participant will control the land for the period.
- B. A participant shall not be eligible for 319 payments for conservation practices on eligible land if the participant receives payment for the same practice under USDA cost share programs
- C. Land otherwise eligible for the 319 project shall not be eligible if the land is subject to a deed or other restriction prohibiting the application of the conservation plan and associated practices, or where a benefit has or will be obtained from a Federal agency in return for the participant's agreement not to implement the conservation plan in the 319 project. By applying for 319 contracts, the participant certifies as a condition for payment that no such restrictions apply to such land.

3 Agreement

- A. The participant Agrees:
 - a. That 319 contracts and its attachment shall be considered a request to enter into the 319 program on the terms specified in the Long-Term Contract for 319 cost share programs and attachment A.
 - b. To place eligible land into the 319 project for a period of 5 years.
 - c. To apply or commence a financially assisted practice within the first 6 months from the date of the contract executed by CD
 - d. Not to start any financially assisted practice before the contract is executed by CD
 - e. To comply with the terms and conditions of the conservation plan of operations and all federal, state, and local laws that apply to the plan content
 - f. To establish, maintain, and replace as specified in the contract, the practices agreed to in the CPO
 - g. Not to undertake any action on land under the participant's control which tends to defeat the purpose of this contract, as determined by CD
 - h. To discontinue work in the general area of the site and notify CD immediately if during the construction of any practice a previously unidentified archeological or historical site is encountered

- i. To maintain proof of payment documentation for 3 years after the end of the fiscal year in which the practice was completed and to prevent this documentation to CD within 30 days if selected for administrative compliance check.
- B. CD agrees, subject to availability of funds, to:
 - a. Share the cost with owners and operators of establishing an eligible practice, or an identified unit thereof, agreed to in the CPO.

4. Conservation Plan of Operations

- A. Subject to approval of the CD, the conservation plan will include all of the following information and requirements:
 - a. The conservation practices to be undertaken on the land enrolled in 319
 - b. A schedule of operations, activities, and estimated expenditures needed to solve identified natural resource problems on the land enrolled in 319
 - c. The level of environmental benefits that must be attained on the land enrolled in 319
 - d. Any other practices required to fulfill the intent of the conservation plan.
- B. By signing the conservation plan, the participant agrees to implement the practices specified in such conservation plan on the land enrolled in 319.

5. Payments

- A. Subject to the availability of funds, cost share payments, as approved by CD, shall be made upon a determination by field representative of the CD that an eligible practice, or an identifiable unit thereof, has been established in compliance with the conservation plan and appropriate standards and specifications.
- B. CD will make cost-share payments, as approved by CD, available to the participant at the rate specified in the CPO
- C. Except as otherwise provided for in this paragraph, cost-share payments, as approved by CD, may be available under the 319 only for establishment or application of an eligible practice. To receive cost-share payments, as approved by CD, the participant, upon certification of the completed practice or unit thereof, must file an invoice form – 319 and original receipts to the CD responsible for the administration of the participant’s farm

6. Provisions Relating to Tenants and Landlords

No payment will be approved for the current year is CD determines that any of the following conditions exist:

- A. The landlord or operator has not given the tenants that have an interest in the unit of concern covered by the conservation plan, or that have a lease that runs through the 319-contract period at the time of sign-up, an opportunity to participate in the benefits of the program.

- B. The landlord or operator has adopted any other scheme or device for the purpose of depriving any tenant of any benefits to which such tenant would otherwise be entitled. If any such conditions occur or are discovered after payment are made, all or any part of the payment, as determined by CD, must be refunded with interest and no further payment shall be made.

7. Erroneous Representation Scheme and Device

- A. A participant who is determined to have erroneously represented any fact affecting a determination with respect to this contract and the regulations applicable to this contract adopted by any scheme or device which tends to defeat the purposes of this contract or made any fraudulent representation with respects to this contract, and the participant must refund CD all payments received by such participant, plus interest with respect to the contract.
- B. The provisions of paragraph 7A of this Attachment shall be applicable in addition to any liability under criminal and civil fraud statutes, or any other liability to which the participant may be subject.

8. Notification of Changes to Terms and Conditions of the Contract

CD agrees that if any changes in any terms and conditions of this contract, including changes necessary to reconcile the technical practices listed on the 319 contract to those specified in the conservation plan, become necessary prior to the date that this contract is approved on behalf of CD, CD will notify the person signing the 319 contract of such changes and such person will be given 10 days from the date of notification in which to agree to the revised terms and conditions or to withdraw from the contract request within 10 days from the date of the issuance of such notice and further agrees that failure to notify the CD will constitute agreement to the revised terms and conditions.

9. Corrections

CD reserves the right to correct all errors in entering data or the results of computations in the contract.

10. Termination of Contract; Joint Liability

If the participant fails to carry out the terms and conditions of this contract, but CD determines that such failure does not warrant termination of this contract, CD may require such participant to refund payments received under this contract or require the participant to accept such adjustments in subsequent payments as a determined to be appropriate by CD.

11. Contract Modifications

- A. CD may modify this contract to add, or substitute certain practices when

- a. The installed practice failed to adequately treat a unit of land or water through no fault of the participants.
- b. The installed practice may cause adverse impacts to significant cultural and environmental resources identified in the CPO, or those discovered because of installation.
- c. The installed measure has deteriorated because of conditions beyond the control of the participant.
- d. Another practice will achieve at least the same level of environmental benefits.
- B. Any modification to the 319 contract or conservation plan will require the concurrence of all participants.
- C. Concurrence of an NRCS certified conservation planner shall be obtained when modifications to this contract involve a technical aspect of a participant's conservation plan.

12. Effective Date and Changes to Contract

- A. The 319 contract is effective when signed by the participants and an authorized representative of the CD. Except as otherwise determined by CD, the contract may not be revoked or revised unless by agreement among the parties. Within the dates established by CD, the contract must be signed by all required participants.
- B. If a statute is enacted during the period of this contract that would materially change the terms and conditions of this contract, the CD may require the participants to elect between acceptance of modifications in this contract consistent with the provisions of such statute or termination of this contract.

13. Civil Rights Requirements

The Federal, State and local agencies implementing the 319 Incremental Watershed Program Project(s) prohibit the discrimination in all programs and activities based on race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientations, and marital or family status.

14. Drug Free Workplace Certification

By signing this agreement, the participant(s) certifies that he/she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while conducting any activity associated with this cost-share agreement. This certification is a material representation of fact upon which reliance was placed when the agency determined to award this cost-share agreement.

Natural Disaster Clause

If a BMP installed under this contract is destroyed due to a natural disaster, the participant(s) will not be held accountable or responsible for reestablishing the BMP if the following conditions are met:

- Practices were originally installed according to USDA NRCS standards and specifications and or an engineer's design.
- Practices have been appropriately maintained after their instillation.
- If the practice in question is Stream Fencing, it must have been installed an average distance of 35 feet from the stream

If funding is available, the participant may receive cost share to be reestablished.

LONG-TERM CONTRACT FOR XXXXXX CREEK INCREMENTAL 319 PROJECT
SEPTIC SYSTEM PUMPING COST SHARE PROGRAMS

Contract No.: XX
Program: XX 319 Septic Pumping
County: _____

Part I – Participant(s)

(1) _____
Landowner Name _____ **Landowner Address** _____
Contract period: from _____ to _____ for \$ 300

Part II – Terms and Conditions

Each of the undersigned and above-named participants hereby agrees to participate in this 319-cost share program and by his/her participation agrees to all the provisions of this contract:

- (1) To carry out on the land unit as shown in Part I hereof, septic system pumping, in conformity with and as shown in the attached plan/schedule of operations, which is hereby made a part of this contract, according to the time schedule noted and in accordance with the conservation treatment and specifications and other special program criteria obtained from the local field office of the West Virginia Conservation Agency,
- (2) To forfeit all rights to further payments or grants under the contract and refund to the conservation district, all payments or grants received there under upon violation of the contract as shown in **Attachment A** which is hereby made a part of this contract, at any stage during the time that the participant has control of the land if the conservation district determines that such a violation is of a nature as to warrant termination of the contract or to make refunds or accept such payment adjustments as the conservation district may deem appropriate if he determines that the participant’s violation does not warrant termination of the contract,
- (3) Upon transfer of the participant’s right and interest in the land during the contract period to forfeit all rights to further payments or grants under the contract and refund the conservation district all payments and grants received there under unless the transferee of the land agrees with the conservation district to assume all obligations of the contract,
- (4) Special provisions are included and are hereby made a part of this contract,
- (5) All practices in the plan/schedule of operations will be maintained for the life of the practice,
- (6) This cost share program will pay 50%, up to \$300.00, of the cost to repair and/or replace a failing septic system within the XXXXXX watersheds within XXXXX County West Virginia. The above signed landowner will be responsible for paying the remaining 50% of the total cost of the project,
- (7) The landowner shall pay the septic contractor the full invoice amount as invoiced from the septic contractor. The landowner shall then submit all associated paperwork, including original invoice from the septic contractor, to receive 50% reimbursement, up to \$300.00, from SCD. Landowner shall submit paperwork for reimbursement to the following address: **Southern Conservation District, 463 Ragland Road, Beckley, WV 25801**
- (8) After installation, care and maintenance will be landowners’ responsibility.
- (9) The Southern Conservation District and/or the West Virginia Conservation Agency shall not be liable for any claims, injuries or damages arising from or any way related to this Project Agreement.

Part III – Participant(s) Signature(s)

Landowner Signature

Date

Part IV – Approval

Designee (Print)	Designee Signature	Date
_____ Southern Conservation District		

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

**LONG-TERM CONTRACT FOR XXXXXXXXX CREEK INCREMENTAL 319 PROJECT
SEPTIC SYSTEM REPAIR COST SHARE PROGRAMS**

Contract No.: XX
Program: XX 319 Septic Upgrade
County: _____

Part I – Participant(s)

(1) _____
Landowner Name Landowner Address

Contract period: from _____ to _____ for \$ 5,000

Part II – Terms and Conditions

Each of the undersigned and above-named participants hereby agrees to participate in this 319-cost share program and by his/her participation agrees to all of the provisions of this contract:

(1) To carry out on the land unit as shown in Part I hereof, septic system repairs, in conformity with and as shown in the attached plan/schedule of operations, which is hereby made a part of this contract, according to the time schedule noted and in accordance with the conservation treatment and specifications and other special program criteria obtained from the local field office of the West Virginia Conservation Agency,

(2) To forfeit all rights to further payments or grants under the contract and refund to the conservation district, all payments or grants received there under upon violation of the contract as shown in **Attachment A** which is hereby made a part of this contract, at any stage during the time that the participant has control of the land if the conservation district determines that such a violation is of a nature as to warrant termination of the contract or to make refunds or accept such payment adjustments as the conservation district may deem appropriate if he determines that the participant’s violation does not warrant termination of the contract,

(3) Upon transfer of the participant’s right and interest in the land during the contract period to forfeit all rights to further payments or grants under the contract and refund the conservation district all payments and grants received there under unless the transferee of the land agrees with the conservation district to assume all obligations of the contract,

(4) Special provisions are included and are hereby made a part of this contract,

(5) All practices in the plan/schedule of operations will be maintained for the life of the practice,

(6) This cost share program will pay 75%, up to \$5,000, of the cost to repair and/or replace a failing septic system within the XXXXXXXXX watersheds within XXXXXXXX County West Virginia. The above signed landowner will be responsible for paying the remaining 25% of the total cost of the project,

(7) A demonstrated need to replace said septic system will be based on approval and receipt of permit from the XXXXXX County Health Department,

(8) Bills will be invoiced directly to Southern Conservation District (SCD) from the contractor for the 75% portion of the project and directly to the landowner from the contractor for the remaining 25% portion of the project. No payments will be made to landowner from SCD. Contractor shall submit paperwork for reimbursement to the following address: **Southern Conservation District, 463 Ragland Road, Beckley, WV 25801**

(9) **After completion of the septic installation the XXXXX County Health Department (XCHD) will inspect the project. Upon receiving the final inspection report from XCHD and FINAL BILL from the contractor, SCD will process payment to the contractor,**

(10) After installation, care and maintenance will be landowners’ responsibility,

(11) The Greenbrier Valley Conservation District, and/or the West Virginia Conservation Agency shall not be liable for any claims, injuries or damages arising from or any way related to this Project Agreement.

Part III – Participant(s) Signature(s)

(1) _____
Landowner Signature
Date

Part IV – Approval

Chairperson or Designee (Print) Chairperson or Designee Signature
Date Southern Conservation District

Appendix D.

WORKSHEET NUMBER 1 -- ESTIMATING CARRYING CAPACITY/STOCKING RATE -- ROTATIONAL GRAZING
How Many Acres Are Needed?

Cooperator Name _____ Farm Number _____
 Prepared By _____ Date Prepared _____

STEP 1: DETERMINING FORAGE DEMAND

Determining Forage Demand/Day

A	B	C	D	E	F	G	H	Notes/Comments	
Animals	Starting Weight	Total Days Grazing ⁽²⁾	Desired ADG ⁽³⁾	Target Weight ⁽⁴⁾ (B + (C x D)) or Mature Animal Wt.	Number of Animals	Intake	Forage Required Per Day ⁽⁵⁾ (E x F x G)		
Growing Animals						0.03	lbs DM		
Cow/Calf ⁽¹⁾						0.03	lbs DM		
Dry Cows						0.02	lbs DM		
Bulls						0.025	lbs DM		
Sheep/Lamb ⁽¹⁾						0.04	lbs DM		
Dry Ewes						0.02	lbs DM		
Other							lbs DM		
Total Required/Day								lbs DM	

- ⁽¹⁾ Calves are included in forage demand for cows; lambs are included in forage demand for sheep.
- ⁽²⁾ If mature animal is in good body condition, Desired ADG (D) is 0.
- ⁽³⁾ Total Days Grazing are the total number of days the animals will be grazing, ie 200 days.
- ⁽⁴⁾ Target Weight = Starting Weight plus (Days Grazing multiplied by ADG)
- ⁽⁵⁾ Forage Required Per Day = Target Weight multiplied by Number of Animals multiplied by Intake

STEP 2: DETERMINING FORAGE AVAILABLE/UTILIZED

2a: Forage dry matter (dm) per acre available

Forage Type	Stand Condition ⁽⁶⁾		Pounds DM/Acre/Inch	To calculate total forage/acre use the following formula: Pounds DM/Acre/Inch multiplied by Pregrazing Height of Grass [_____ lbs DM/Acre/Inch X _____ In] = _____ lbs DM/Acre Available
	Fair	Good		
Unimproved Pasture	50-100	100-200	..	
Bluegrass/Clover	100-250	250-400	400-500	
Tall grass/Legume	100-200	200-300	300-400	
Tall Fescue	100-200	200-300	300-400	
Alfalfa or Red Clover	150-200	200-250	250-300	
Tall Warm Season	50-100	100-200	200-300	
Other				

- ⁽⁶⁾ Fair stand condition has less than 75% of ground covered. Plant species present are considered desirable species.
- ⁽⁶⁾ Good stand condition has 75-90% of ground covered. Plant species present are considered desirable species.
- ⁽⁶⁾ Excellent stand condition exceeds 90% of ground covered. Plant species present are considered desirable species.

continued on page 2

WORKSHEET 1 -- CARRYING CAPACITY/STOCKING RATE -- CONTINUED

2b: Forage dry matter (dm) per acre utilized

The available forage/ac to be utilized (consumed) depends on how many days the animals will be on the paddock. Refer to the following chart

Approximate Utilization Rate	Forage Consumed Percent of Total
1-2	75
3-4	70
5-6	60
7	55
8	45
9+	40

The formula is: Percent Consumed multiplied by: Total lbs DM/Ac Available

[_____] % X [_____] lbs DM/Ac = [_____] lbs DM/Acre Utilized
(step 2a)

STEP 3: HOW MANY PADDOCKS ARE NEEDED?

For estimating regrowth rates, local knowledge is best. If not available, use the following as a guide:
 Spring/Early Summer 18-24 days; Mid-Summer 36-44 days.

The formula is: (Days Required to Regrow to Desired Height divided by: Days on Paddock) plus 1

Spring [_____] Days for Regrowth / [_____] Days on Paddock + 1 = _____ Paddocks
(local knowledge) (answer input)

Mid-Summer [_____] Days for Regrowth / [_____] Days on Paddock + 1 = _____ Paddocks
(local knowledge) (answer input)

STEP 4: DETERMINE SIZE OF EACH PADDOCK

The formula is: Forage Demand/Day multiplied by: Number of Days on Paddock divided by: Forage Utilized Per Acre

[_____] lbs DM/Day Required X [_____] Days / [_____] lbs DM/Ac Utilized = _____ Acres/Paddock
(step 1) (answer input) (step 2b)

STEP 5: DETERMINE TOTAL ACRES NEEDED

The formula is: Paddock Size multiplied by: Number of Paddocks

Spring [_____] Ac/Paddock X [_____] Paddocks = _____ Total Acres Required
(step 4) (step 3)

Mid-Summer [_____] Ac/Paddock X [_____] Paddocks = _____ Total Acres Required
(step 4) (step 3)

Note: This form can be used to compare various options. For example, by changing the number of days on the paddock, the utilization rate will change, which will change the final answer.

Notes/Comments

WORKSHEET 2 – CARRYING CAPACITY/STOCKING RATE – CONTINUED

STEP 3: ACRES IN EACH PADDOCK

The formula is: Total Acres Available divided by: Number of Paddocks
 [_____ Acres / _____ Paddocks] = _____ Acres/Paddock

Notes/Comments

STEP 4: FORAGE PER PADDOCK

The formula is: Acres per Paddock multiplied by: Forage Utilized Per Acre
 [_____ Acres/Paddock X _____ lbs DM Utilized/Ac] = _____ lbs DM/Paddock

STEP 5: DETERMINE FORAGE AVAILABLE PER DAY

The formula is: Forage Available/Paddock divided by: Number of Days On Paddock
 [_____ lbs DM/Paddock / _____ Days on Paddock] = _____ lbs DM Available/Day

STEP 6: BALANCE LBS DM AVAILABLE PER DAY TO DEMAND PER DAY

- Procedure:
1. Determine the class of animal (A) - this determines the intake rate (x 800).
 2. For Growing Animals--enter Starting Weight (B), Desired ADG (C) and Total Days Grazing (D).
 3. Estimate the Target Weight of the Animal (E). Target Weight = Starting weight plus (ADG multiplied by Total Days Grazing)
 4. For Mature Animals-- If animal is in good body condition, Desired ADG (C) is 0 or go directly to (E) Mature Animal Weight.
 5. Intake (F) -- Calves are included in forage demand for cows; lambs are included in forage demand for sheep.
 6. Estimate Forage DM Demand/Day (G). Forage DM Demand/Day = Target Weight or Mature Animal Weight multiplied by Intake.
 7. Forage DM Available per Day (from step 5) (H) divided by Forage DM Demand per Day (G) = Number of Animals (I).

A	B	C	D	E	F	G	H	I
Animals	Starting Weight	Desired ADG	Total Days Grazing	Target Weight (B + C x D) or Mature Animal Weight	Intake	Forage DM Demand/Day (E x F)	Forage DM Available/Day (Step 5)	Number of Animals (H / G)
Growing Animals					0.03			
Cow/Calf					0.03			
Dry Cows					0.02			
Bulls					0.025			
Sheep/Lamb					0.04			
Dry Ewes					0.02			
Other								
Total ¹²¹								

¹²¹ CAUTION: Total forage demand/day of all classes cannot exceed total forage available per day (from step 5).
 Note: This form can be used to compare various options. For example, by changing the number of days on the paddock, the utilization rate will change, which will change the final answer. Also, the regrowth time, as well as the animal weight, may differ during over the grazing season (April, May vs. July, Aug., etc). Use multiple worksheets to display differences.

WORKSHEET NUMBER 3 -- ESTIMATING CARRYING CAPACITY/STOCKING RATE--CONTINUOUS GRAZING

Co operator Name _____ Farm Number _____

Prepared By: _____ Date Prepared _____

Step 1 - Estimate Pounds of Liveweight/Farm

The formula is:

(Annual Forage Production (Table 1.) multiplied by Acres of the Farm) divided by:
 (Average Daily Intake (Table 2.) multiplied by Length of Grazing Season)

$$\left[\frac{\text{_____ lbs DM/Ac} \times \text{_____ Ac/Farm}}{\text{_____ Intake (lbs DM/lb Liveweight/Day)} \times \text{_____ Days}} \right] = \text{_____ lbs of Liveweight/Farm}$$

(Table 1.) (Table 2.)

Notes:

Table 1. Annual Forage Production

Forage Type	Stand Condition ¹⁾		
	Fair	Good	Excellent
Unimproved Pasture	300-600	600-1200	--
Bluegrass/Clover	600-1500	1500-2400	2400-3000
Tall grass/legume	1200-2400	2400-3600	3600-4800
Tall Fescue	1200-2400	2400-3600	3600-4800
Alfalfa or Red Clover	1800-2400	2400-3000	3000-3600
Other			

Table 2. Average Daily Intake

Animal	Intake
Growing Animals	0.03
Cow/Kalf ^{1b)}	0.03
Dry Cows	0.02
Bulls	0.025
Sheep/Lambs ^{1b)}	0.04
Dry Ewes	0.02
Other	

¹⁾ Fair stand condition has less than 75% of ground covered. Plant species present are considered desirable species. Good stand condition has 75-90% of ground covered. Plant species present are considered desirable species. Excellent stand condition exceeds 90% of ground covered. Plant species present are considered desirable species.
²⁾ Pounds of Dry Matter per Acre have been adjusted to account for seasonal growth and utilization rate.
³⁾ Calves are included in forage demand for cows; lambs are included in forage demand for sheep.

Step 2 - Estimate Number of Animals

The formula is:

Total Liveweight/Farm divided by Weight of one Animal

$$\left[\frac{\text{_____ lbs Liveweight/Farm}}{\text{_____ lbs Ani. Wgt.}} \right] = \text{_____ Number of Animals that can be supported for the Grazing Season¹⁾$$

(Step 1)

¹⁾ Use the same class animal that you used in Step 1 (cow, bulls, etc.). If more than one animal class is being planned, determine the right balance by "trial and error". Also, total liveweight/farm is based on the entire grazing season and does not consider seasonal growth patterns of forages. It is possible to have a higher carrying capacity for the grazing season than what is capable mid-year.

WORK SHEET NUMBER 4 -- ESTIMATING DAYS OF STOCKPILED FORAGE AVAILABLE

Cooperator Name _____ Farm Number _____
 Prepared By _____ Date _____

This worksheet is designed as a way to estimate the total number of days available for grazing a stockpiled area. Normally, a cooperator has a set number of animals that will be grazing a set acreage that has been stockpiled. The formula can be interchanged to determine other data--number of acres needed, number of animals, etc - simply by inserting the known data and solving for the desired information.

Step 1. Determine Forage Available

1a. Estimate lbs of DM/Acre. The formula is:

Forage Density (Table 1) multiplied by Height at Turn-in¹¹:
 [_____ lbs/Ac/Inch X _____ inches] = _____ lbs DM/Ac
 (Table 1)

1b. Estimate lbs of DM Available. The formula is:

A_c Stockpiled multiplied by 1b DM/Ac multiplied by Utilization Rate (Table 2)
 [_____ A_c X _____ b DM/Ac X _____ % Utiliz.] = _____ lbs DM Available
 (step 1a) (Table 2)

¹¹ Turn in height is highly variable. With N and adequate rainfall, the forage should be at least 12 inches tall after 90 days of stockpiling.

Step 2. Determine Forage Demand

The formula is: Number of Animals (B) multiplied by Animal Weight (C) multiplied by Intake (D)

A Animal	B Number of Animals	C Animal Weight	D Intake	E Lbs DM Required Per Day (B x C x D)
Growing Animals			0.03	
Cow/Calf ¹²			0.03	
Dry Cows			0.02	
Bulls			0.025	
Sheep/Lamb ¹³			0.04	
Dry Ewes			0.02	
Other				
Total Required/Day				_____ lbs DM

¹² Calves are included in forage demand for cows; Lambs are included in demand for sheep.

Step 3. Estimate the Number of Grazing Days Available

The formula is: DM Available (step 1b) divided by Forage Demand/Day (step 2)

[_____ lbs DM Available / _____ lbs Total Forage DM Demand/Day] = _____
 (step 1b) (step 2) Approx. Grazing Days Available

Table 1. Forage Density

Forage Type	Stand Condition ¹⁴		
	Fair	Good	Excellent
Bluegrass/Clover	100-200	250-400	400-600
Orchardgrass/legume	100-200	200-300	300-400
Tall Fescue/Legume	100-200	200-300	300-400
Tall Fescue/Nitrogen	150-250	250-350	350-450
Other			

¹⁴ Fair Stand Condition: <75% ground covered.
 Good Stand Condition = 75-90% ground covered.
 Excellent Stand Condition: >90% ground covered.
 Note: Plant species present are considered desirable.

Table 2. Approx. Utilization Rate

Days on Field	Utilization Rate (Forage Consumed--Percent of Total)
1-2	75
3-4	70
5-6	60
7	55
8	45
9+	40

Notes/Comments

PIPESTEM CREEK WVKNB-51 WATERSHED BASED PLAN

Appendix E.

LS Factor	Values of the topographic factor ,LS, for specific combinations of slope length and steepness											
Percent Slope	Slope Length (feet)											
	25	50	75	100	150	200	300	400	500	600	800	1000
0.2	0.06	0.069	0.075	0.08	0.086	0.092	0.099	0.105	0.11	0.114	0.121	0.126
0.5	0.073	0.083	0.09	0.096	0.104	0.11	0.119	0.126	0.132	0.137	0.145	0.152
0.8	0.086	0.098	0.107	0.113	0.123	0.13	0.141	0.149	0.156	0.162	0.171	0.179
2	0.133	0.163	0.185	0.201	0.227	0.248	0.28	0.305	0.326	0.344	0.376	0.402
3	0.19	0.233	0.264	0.287	0.325	0.354	0.4	0.437	0.466	0.492	0.536	0.573
4	0.23	0.303	0.357	0.4	0.471	0.528	0.621	0.697	0.762	0.82	0.92	1.01
5	0.268	0.379	0.464	0.536	0.656	0.758	0.928	1.07	1.2	1.31	1.52	1.69
6	0.33	0.476	0.583	0.673	0.824	0.952	1.17	1.35	1.5	1.65	1.9	2.13
8	0.496	0.701	0.859	0.992	1.21	1.41	1.72	1.98	2.22	2.43	2.81	3.14
10	0.685	0.968	1.19	1.37	1.68	1.94	2.37	2.74	3.06	3.36	3.87	4.33
12	0.903	1.28	1.56	1.8	2.21	2.55	3.13	3.61	4.04	4.42	5.11	5.71
14	1.15	1.62	1.99	2.3	2.81	3.25	3.98	4.59	5.13	5.62	6.49	7.26
16	1.42	2.01	2.46	2.84	3.48	4.01	4.92	5.68	6.35	6.95	8.03	8.98
18	1.72	2.43	2.97	3.43	4.21	3.86	5.95	6.87	7.68	8.41	9.71	10.9
20	2.04	2.88	3.53	4.08	5	5.77	7.07	8.16	9.12	10	11.5	12.9

C Factor	Percent of Ground Cover										
Type & Height of Raised Canopy	Canopy Cover %	Type	0	20	40	50	60	70	80	90	95-100
No appreciable canopy		G	0.45	0.2	0.1	0.071	0.042	0.028	0.013	0.008	0.003
		W	0.45	0.24	0.15	0.12	0.09	0.067	0.043	0.027	0.011
Canopy of tall weeds or short brush (0.5m fall ht.) 20"	25	G	0.36	0.17	0.09	0.064	0.038	0.025	0.012	0.008	0.003
		W	0.36	0.2	0.13	0.106	0.082	0.062	0.041	0.026	0.011
	50	G	0.26	0.13	0.07	0.053	0.035	0.024	0.012	0.008	0.003
		W	0.26	0.13	0.07	0.053	0.035	0.024	0.012	0.008	0.003
Appreciable brush or bushes (2m fall ht.) 6-1/2"	25	G	0.4	0.18	0.09	0.065	0.04	0.027	0.013	0.016	0.003
		W	0.4	0.22	0.14	0.113	0.085	0.064	0.042	0.027	0.011
	50	G	0.34	0.16	0.085	0.062	0.038	0.05	0.012	0.008	0.003
		W	0.34	0.19	0.13	0.106	0.081	0.061	0.041	0.026	0.011
75	G	0.28	0.14	0.08	0.058	0.036	0.024	0.012	0.008	0.003	
	W	0.28	0.17	0.12	0.099	0.077	0.059	0.04	0.026	0.011	
Trees but no appreciable low brush. (4m fall ht.) 13"	25	G	0.42	0.19	0.1	0.071	0.041	0.027	0.013	0.008	0.003
		W	0.42	0.23	0.14	0.114	0.087	0.065	0.042	0.027	0.011
	50	G	0.39	0.18	0.09	0.065	0.04	0.027	0.013	0.008	0.003
		W	0.39	0.21	0.14	0.113	0.085	0.064	0.042	0.027	0.011

Cover Management Factors (C) - Construction Sites			
Type of Cover		Factor C	% Cover
None (Fallow Ground)		1	0
Temporary Seeding (90% stand)			
Ryegrass (perennial)		0.05	95
Ryegrass (annuals)		0.1	90
Small Grain		0.05	95
Millet or Sudan Grass		0.05	95
Field Bromegrass		0.03	97
Permanent Seeding (90% Stand)		0.01	99
Sod (laid immediately)		0.01	99
Mulch	Application Rate T/A		
Hay	0.5	0.25	75
Hay	1	0.13	87
Hay	1.5	0.07	93
Hay	2	0.02	98
Small grain straw	2	0.02	98
wood chips	6	0.06	94
wood cellulose	1.75	0.1	90

County	R Factor
Grant	125
Hampshire	125
Hardy	125
Mineral	125
Pendleton	125
All other WV Counties	150

Support Practice Factor (P) for Cultivated Lands			
Slope %	Contouring	Contour, Strip Cropping, and Irrigated furrows	Terracing
1-2%	0.6	0.3	0.12
3-8%	0.5	0.25	0.1
9-12%	0.6	0.3	0.12
13-16%	0.7	0.35	0.14
17-20%	0.8	0.4	0.16
21-25%	0.9	0.45	0.18

Practice Factor (P) - Surface Conditions For Construction Sites					
Surface Conditions With No Cover					Factor P
Compact and smooth, scraped with bulldozer or scraper up and downhill					1.3
Same condition, except raked with bulldozer root rake up and downhill					1.2
Compact and smooth, scraped with bulldozer or scraper across the slope					1.2
Same conditions, except raked with bulldozer root rake across the slope					0.9
Loose as a disked plow layer					1
Rough, irregular surface equipment track in all directions					0.9
Loose with rough surface greater than 12" depth					0.8
Loose with smooth surface greater than 12" depth					0.9

Soil T and K Factors					
For Soil T, K, and bulk density values, access the USDA Soil Data Mart at the following website: http://soildatamart.nrcs.usda.gov					
Then follow these directions:					
1) Click "Select State"					
2) Highlight West Virginia					
3) Click "select survey area"					
4) Highlight the soil survey you are interested in					
5) Click "Generate Reports"					
6) Click "select all"					
7) Click on the blue arrow next to "Report description and pick Soil Physical Properties"					
8) Click "generate report". This is a .pdf file containing soil T and K values that you can print or save.					
Note* Factor Kw applies to whole soil (with rock), and Kf applies only to fine-earth fractions (without rock)					
Other soil information can be found at: http://websoilsurvey.nrcs.usda.gov/app/					

Appendix F:

COMMON ACRONYMS

TMDL	Total Maximum Daily Load
WLA	Waste load allocation
LA	Load allocation
LR	Load reduction
MOS	Margin of safety
BL	Baseline
USEPA or EPA	US Environmental Protection Agency
DEP	WV Department of Environmental Protection
WVCA	WV Conservation Agency
NRCS	USDA Natural Resources Conservation Service
HD	Health Department
BPH	Bureau of Public Health
WAB	Watershed Assessment Branch
OSLP	On-site Loan Program
BMP	Best management practice
WQ	Water quality
ES	Environmental Specialist
IWSS	Institute for Water Security and Science
WVU	West Virginia University
WVSOS	West Virginia Save Our Streams
ICT	Interagency Conservation Tool
SCD	Southern Conservation District

