NRCS West Virginia

Preliminary Investigation Feasibility Report (PIFR)

Meadow River Watershed (HUC #0505000506)

October 2022

Table of Contents

Abbreviations

CFR – Code of Federal Regulations

NECH – National Environmental Compliance Handbook

NWPH – National Watershed Program Handbook

NWPM – National Watershed Program Manual

PIFR – Preliminary Investigation Feasibility Report

USC – United States Code

References

- NRCS National Environmental Compliance Handbook, Title 190, Part 610, May 2016
- NRCS National Watershed Program Manual, April 2014
- NRCS National Watershed Program Handbook, April 2014
- DM 9500-013 – Guidance For Conducting Analyses Under The Principles, Requirements, And Guidelines For Water And Land Related Resources Implementation Studies And Federal Water Resource Investments, January 2017
- Principles and Requirements for Federal Investments in Water Resources, March 2013
- NB 390-21-4 PDM - Watershed and Flood Prevention Operations Program Funding Guidance - Preliminary Investigation Feasibility Reports and Remedial Projects, July 2022

Summary

The following PIFR is a summary report of resource concerns and opportunities in the Meadow River Watershed that may be eligible for a planning study according to the Watershed Protection and Flood Prevention Act (PL 83-566). The watershed covers portions of Greenbrier, Fayette, Nicholas, and Summers Counties. The Town of Rainelle in Greenbrier County requested formal assistance from the NRCS Watershed Operations Program for this feasibility report.

The study area is in the Greenbrier Valley, where there is a relatively large agricultural industry.

Potential solutions to resource problems and opportunities contained in this report could provide long-term relief with positive impacts to environmental, economic, and social aspects of living in the watershed. The baseline condition without Federal investment is a situation of continued flooding and unrealized opportunities that could be realized with a watershed project. The alternatives that were developed for the PIFR include structural and non-structural measures including land treatment practices and possible construction of new infrastructure.

Alternatives require participation by private landowners to implement. Examples of benefits include reduced flood damage, improved watershed protection, and increased recreational options.

Applicable Agency Authority and Authorized Purposes

The table below, provides documentation that the project is eligible for federal assistance and will meet statutory requirements.

Describe the potential project watershed area; how does the area meet the requirements outlined in NRCS's National Watershed Program Manual (See 506.50 NWPM Glossary - TTT. Watershed).		
Response: The Town of Rainelle requested assistance with conducting a Preliminary Investigation and Feasibility Report (PIFR) for a potential watershed project in the Meadow River Watershed (10-digit HUC (0505000506). This assistance is authorized under the Watershed Protection and Flood Prevention Act (Public Law 83-566). The Town of Rainelle is interested in being a sponsor for a watershed plan project in the Meadow River Watershed and meets the PL 83-566 criteria for a sponsor. Agricultural and forested lands compose most of the watershed. Flood protection, watershed protection, recreation, and agricultural water management would be the likely purposes of a potential watershed project.		
Will the project area exceed 250,000 acres in size? [1,2]	☐ YES	☒NO
If over 250,000 acres will it be divided into sub-watersheds in one plan?	☐ YES	☒NO
Potential Project Area Size: **233,715** acres		
Will any single structure provide more than 12,500 acre-feet of floodwater detention capacity, or have a 25,000 acre-feet of total capacity?	☐ YES[3]	☒NO
How many recreational developments will be included in the project area?		
• One development in a project area less than 75,000 acres	☒YES	☐NO
• Two developments in a project area between 75,000 and 150,000 acres	☐ YES	☒NO
• Three developments in a project area greater than 150,000 acres	☐ YES	☒NO

Which authorized purposes will the project address? (Indicate only one purpose as primary):		
	Primary	Other
• Flood prevention	☒	☐
• Watershed Protection	☐	☒
• Public Recreation	☐	☐
• Public Fish and Wildlife	☐	☐
• Agricultural Water Management	☐	☒
• Municipal or Industrial Water Supply	☐	☐
• Water Quality Management	☐	☐

Will the project produce substantial benefits to the general public, to communities, and to groups of landowners?	☒YES	☐ NO[3]
Can the project be installed by individual or collective landowners under alternative cost-sharing assistance?	☐ YES[3]	☒NO
Will the project have strong local citizen and sponsor support through agreements to obtain land rights, permits, contribute the local cost of construction, and carry out operation and maintenance.	☒YES	☐ NO[3]
Will the project take place in a Special Designated Area? (if yes, check applicable area below.)	YES	☐NO

Appalachia	☒	Delaware River Basin	☐	Susquehanna River Basin	☐	Tennessee Valley	☐

1- For specific appropriations, the 250,000 acres is waived except for watershed projects with the flood prevention purpose.

2- Watersheds exceeding 250,000 acres can be broken up into smaller sub-watersheds.

3- The project will not meet the statutory requirements.

References:

16 USC 18 - §1004, Conditions for Federal assistance
7 CFR 611 - 11, Eligible Watershed Projects
Title 390, NWPM – 500.3 Eligible Purposes

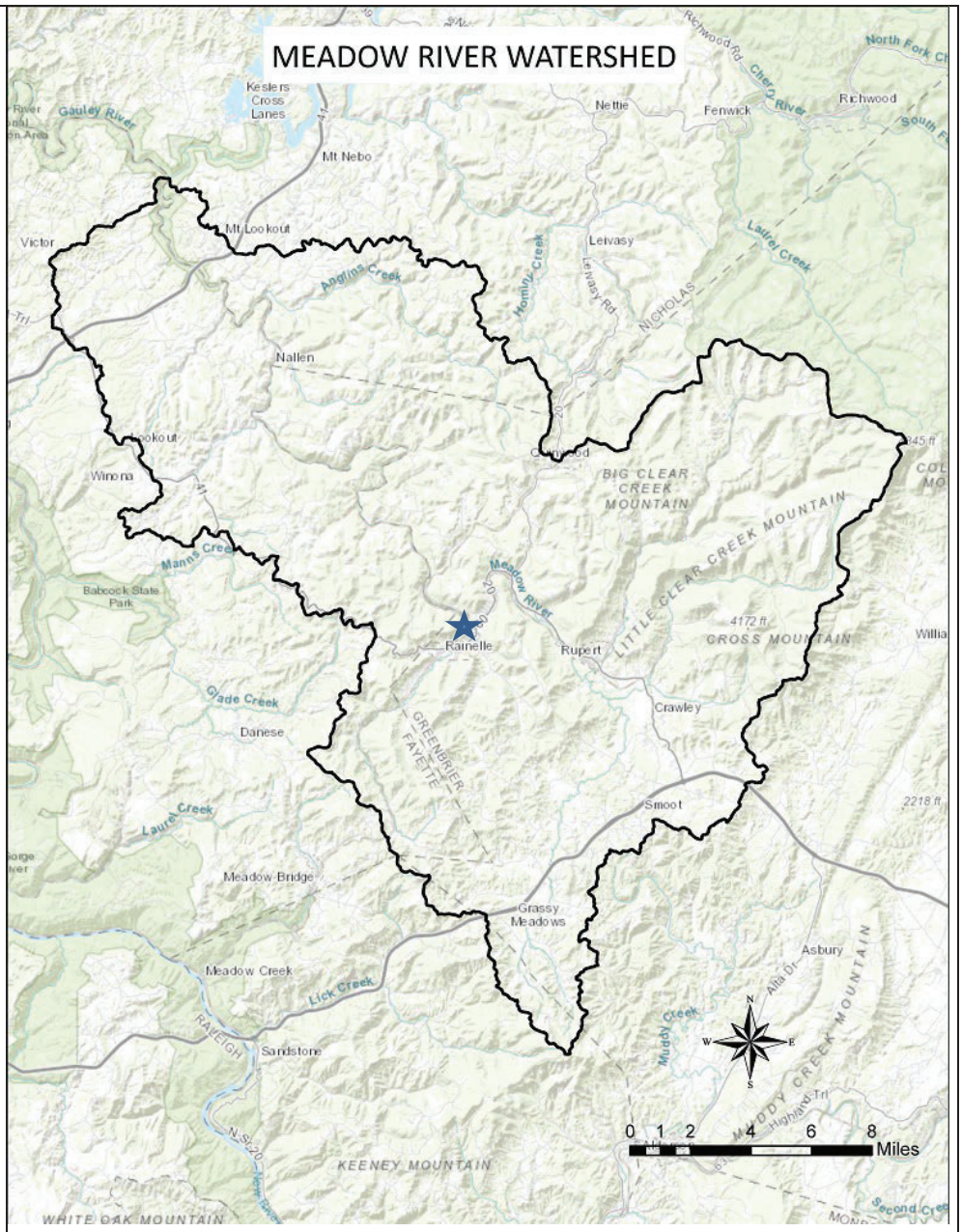
Potential for 20% Agricultural (Rural) Benefits

Meadow River Watershed covers portions of Greenbrier, Fayette, Nicholas, and Summers Counties. These counties cover a combined area of 2,714 square miles and have a combined population of 121,634, resulting in a population density of 45 persons per square mile. In comparison, the population density for the state of West Virginia is 77 people per square mile and nationally the population density is 94 people per square mile. As per the USDA definition, this area is considered rural because there are no population centers with more than 50,000. Because it is rural, at least 20% of the benefits will meet the agricultural (rural) requirement. Populations potentially benefitting from a project would include rural residents, small businesses, and the general public.

References:

16 USC 18 - §1002, Definitions
Title 390, NWPM – 506.50 Glossary, MMM. Rural or Rural Communities

Project Overview	
Proposed Project Name	Meadow River Watershed (HUC #0505000506)
State	West Virginia
County	Nicholas, Greenbrier, Summers, Fayette Counties
Congressional District	1st Congressional District

USGS Hydrologic Unit Code (HUC) and Watershed Name	 **Map of Meadow River Watershed,** **Greenbrier, Fayette, Nicholas, and Summers County, WV** 10-digit HUC (0505000506) **Total Watershed Drainage Area: 233,715 acres**
General Coordinates of the Watershed	Latitude 37.992778° , Longitude -80.736667°

Project Setting	***Reference:*** Title 190 – NECH 610.69 The Meadow River Subwatershed of the Kanawha River Watershed is located in MLRA 127, Eastern Allegheny Plateau & Mountains. The Meadow River flows in a northwest direction to its' confluence with the Gauley River near Carnifex Ferry, West Virginia. The Gauley River joins the New River at Kanawha Falls, West Virginia to form the Kanawha River. The Kanawha River eventually joins the Ohio River at Pt. Pleasant, West Virginia. The Ohio River joins the Mississippi River at Cairo, Illinois. The Mississippi flows into the Gulf of Mexico. The total watershed drainage area is 233,715 acres. This breaks down to 142,500 Acres in Greenbrier County, 61,250 Acres in Fayette County, 26,465 Acres in Nicholas County, & 3,500 Acres in Summers County West Virginia. The topography in the watershed ranges from an elevation of 4,380 MSL at Grassy Knob on Old Fields Mountain in Greenbrier County to a low point of approximate elevation 1,190' MSL at the confluence of the Meadow River with the Gauley River at the northern end of the watershed. The Meadow River flows through Grassy Meadows, Dawson, Rupert, Hines, Charmco, Rainelle, Russellville, & Nallen, West Virginia. The watershed falls entirely in MLRA 127, Eastern Allegheny Plateau & Mountains. The geology is characterized by mostly flat-lying sedimentary beds. The overall topography is that of a high but strongly dissected plateau sharply cut by the lower Meadow River and less so by smaller tributaries. The rock strata have considerable thickness consisting of sandstone, limestone, and shale. The watershed contains the second largest wetland complex in the state, only behind Canaan Valley. West Virginia has a humid continental climate. Southeastern West Virginia, much like the rest of the state, experiences moderately cold winters and warm, humid summers. West Virginia has the highest average elevation east of the Mississippi River which helps moderate summer temperatures. The jet stream is located near or over the northeast during the winter bringing frequent storm systems to the watershed. Greenbrier County, in an average year, receives 44 inches of rain and 39 inches of snow. The average summer high is 81 degrees Fahrenheit in July, and the average winter low is 19 degrees Fahrenheit in January.

	Fayette County, in an average year, receives 46 inches of rain and 38 inches of snow. The average summer high is 82 degrees Fahrenheit in July, and the average winter low is 22 degrees Fahrenheit in January. As an average, Nicholas County receives 51 inches of rain and 53 inches of snow. The average summer high is 81 degrees Fahrenheit in July, and the average winter low is 21 degrees Fahrenheit in January. Summers County, in an average year, receives 39 inches of rain and 24 inches of snow. The average summer high is 83 degrees Fahrenheit in July, and the average winter low is 21 degrees Fahrenheit in January.
Potential Project Area - Size	Meadow River Watershed 10-digit HUC (0505000506) is 233,715 acres.

Resource Information	
Soils	The project area lies within Major Land Resource Areas (MLRA) 127. These MLRA's are characterized by sandstone or shale ridges in the dissected landscapes of the plateau. The soils in this watershed are primarily composed of silt with varying amounts of sand and clay depending on their parent materials. The ridges are mostly formed in residuum derived from interbedded sandstone or shale and are acid. Limestone is occasionally present. They are commonly shallow to moderately deep to bedrock and are moderately well to well drained. Backslopes are formed in colluvium from sandstone, shale, or limestone. These soils are deep to very deep and may have a fragipan that perches water for a portion of the year. These soils are somewhat poor to well drained. The foot slopes, where formed in the red clays are very clayey, deep to very deep, and are prone to slope failures and slope creep, especially when disturbed. Terraces may exist at varying heights above the streams. These soils formed from old alluvium and are typically very deep. They are poorly to moderately well drained and may contain high amounts of clay in the wettest soils. Finally, the floodplain soils formed in the most recent alluvial sediments. These soils are deep to very deep and well to poorly drained. They range from sandy and gravelly to clayey but are mostly loamy or silty. Hydric soils are most likely to occur on the floodplains and terraces but may be found in seeps and drains of higher lying landforms. Surface coverage of rock outcrops or loose stones and boulders may occur especially in areas influenced by sandstone.
Water	The quality of water making up the watershed is affected by non-point pollution in the urban areas. The upland areas of the watershed produce high sediment loads during runoff producing rains. Floodplain scour of adjacent floodplains also increase the sediment load of floodwaters during flood events. The watershed has areas with a surplus of water quantity and areas with depleted water quantity in normal conditions.
Air	The watershed is not in an area recognized for regularly having impaired air quality or any significant air quality issues.
Plants	The watershed provides for both agricultural crops as well as naturally vegetated areas utilized as wildlife habitat.

Animals	This area has animal resources consisting of game, non-game, and invasive species.
Energy	This area has various electrical, oil, and gas transmission facilities. Coal mines, both surface and deep mines, are present within the watershed.
Human	Demographics: For the purposes of this report, statistics were used for all four counties that include portions of the watershed. The U.S. Census 2020 reports the population of Greenbrier County at 34,893 in 2020. In contrast, between the 2010 and 2020 census, the population of West Virginia decreased by 3.2%.

Greenbrier County WV Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	32,471 (100%)
Population in Households	32,070 (98.8%)
Population in Families	25,072 (77.2%)
Population in Group Quarters[1]	401 (1.2%)
Population Density	32
Diversity Index[2]	18

HOUSING	
Total HU (Housing Units)	17,789 (100%)
Owner Occupied HU	10,258 (57.7%)
Renter Occupied HU	3,939 (22.1%)
Vacant Housing Units	3,592 (20.2%)
Median Home Value	$134,819
Average Home Value	$169,777
Housing Affordability Index[3]	153

INCOME	
Median Household Income	$42,421
Average Household Income	$59,810
% of Income for Mortgage[4]	17%
Per Capita Income	$26,171
Wealth Index[5]	46

HOUSEHOLDS	
Total Households	14,197
Average Household Size	2.26
Family Households	8,763
Average Family Size	3.00

Nicholas County WV Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	24,184 (100%)
Population in Households	24,081 (99.6%)
Population in Families	19,739 (81.6%)
Population in Group Quarters[1]	103 (0.4%)
Population Density	37
Diversity Index[2]	10

HOUSING	
Total HU (Housing Units)	12,438 (100%)
Owner Occupied HU	8,334 (67.0%)
Renter Occupied HU	2,163 (17.4%)
Vacant Housing Units	1,941 (15.6%)
Median Home Value	$95,691
Average Home Value	$125,654
Housing Affordability Index[3]	214

INCOME	
Median Household Income	$42,261
Average Household Income	$60,294
% of Income for Mortgage[4]	12%
Per Capita Income	$26,177
Wealth Index[5]	47

HOUSEHOLDS	
Total Households	10,497
Average Household Size	2.29
Family Households	7,050
Average Family Size	3.00

Fayette County WV Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	39,514 (100%)
Population in Households	38,029 (96.2%)
Population in Families	30,427 (77.0%)
Population in Group Quarters[1]	1,485 (3.8%)
Population Density	60
Diversity Index[2]	21

HOUSING	
Total HU (Housing Units)	18,899 (100%)
Owner Occupied HU	12,637 (66.9%)
Renter Occupied HU	3,397 (18.0%)
Vacant Housing Units	2,865 (15.2%)
Median Home Value	$115,538
Average Home Value	$156,966
Housing Affordability Index[3]	192

INCOME	
Median Household Income	$46,986
Average Household Income	$63,310
% of Income for Mortgage[4]	13%
Per Capita Income	$25,798
Wealth Index[5]	49

HOUSEHOLDS	
Total Households	16,034
Average Household Size	2.37
Family Households	10,244
Average Family Size	3.00

Summers County WV Data & Demographics (As of July 1, 2022)

POPULATION	
Total Population	11,570 (100%)
Population in Households	10,581 (91.5%)
Population in Families	8,405 (72.6%)
Population in Group Quarters[1]	989 (8.5%)
Population Density	32
Diversity Index[2]	19

HOUSING	
Total HU (Housing Units)	6,377 (100%)
Owner Occupied HU	3,566 (55.9%)
Renter Occupied HU	1,193 (18.7%)
Vacant Housing Units	1,618 (25.4%)
Median Home Value	$92,413
Average Home Value	$117,162
Housing Affordability Index[3]	220

INCOME	
Median Household Income	$40,843
Average Household Income	$55,672
% of Income for Mortgage[4]	12%
Per Capita Income	$23,277
Wealth Index[5]	42

HOUSEHOLDS	
Total Households	4,759
Average Household Size	2.22
Family Households	2,990
Average Family Size	3.00

(Reference: hometownlocator.com)

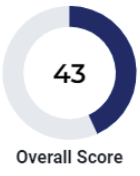
Quality of Life: According to USNews, Greenbrier County scores better overall than the WV state average in quality-of-life indicators, but slightly less than the national average. Fayette, Summers, Nicholas Counties score below the state and national benchmarks for quality of life indicators.

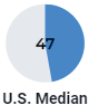
[How Healthy are West Virginia Counties? | US News Healthiest Communities]

Overview of Greenbrier County, WV

See COVID-19 Data for Greenbrier County, WV »

43/100 OVERALL SCORE





CATEGORY	SCORE
Population Health	43
Equity	61
Education	51
Economy	39
Housing	50
Food & Nutrition	58
Environment	48
Public Safety	52
Community Vitality	62

Overview of Fayette County, WV

See COVID-19 Data for Fayette County, WV »

30/100 OVERALL SCORE	CATEGORY	SCORE
	Population Health	19
	Equity	73
	Education	46
	Economy	33
	Housing	51
	Food & Nutrition	44
	Environment	58
	Public Safety	39
	Community Vitality	47
	Infrastructure	43

Overall Score

State Median

Peer Group Median
Urban, Up-and-Coming

U.S. Median

Read our methodology to see how the scores and rankings were calculated.

See the top communities overall »

Overview of Nicholas County, WV

See COVID-19 Data for Nicholas County, WV »

32/100 OVERALL SCORE

Overall Score

State Median

Peer Group Median
Rural, Up-and-Coming

U.S. Median

Read our methodology to see how the scores and rankings were calculated.

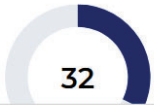
CATEGORY	SCORE
Population Health	33
Equity	61
Education	53
Economy	33
Housing	53
Food & Nutrition	52
Environment	61
Public Safety	28
Community Vitality	61
Infrastructure	28

See the top communities overall »

Overview of Summers County, WV

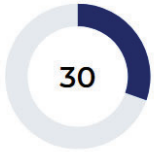
See COVID-19 Data for Summers County, WV »

32/100 OVERALL SCORE



Overview | Population Health | Equity | **Education** | Economy | Housing | More

State Median



Peer Group Median
Rural, Up-and-Coming

U.S. Median

Read our methodology to see how the scores and rankings were calculated.

CATEGORY	SCORE
Population Health	28
Equity	73
Education	47
Housing	30
Food & Nutrition	41
Environment	64
Public Safety	54
Community Vitality	50
Infrastructure	36

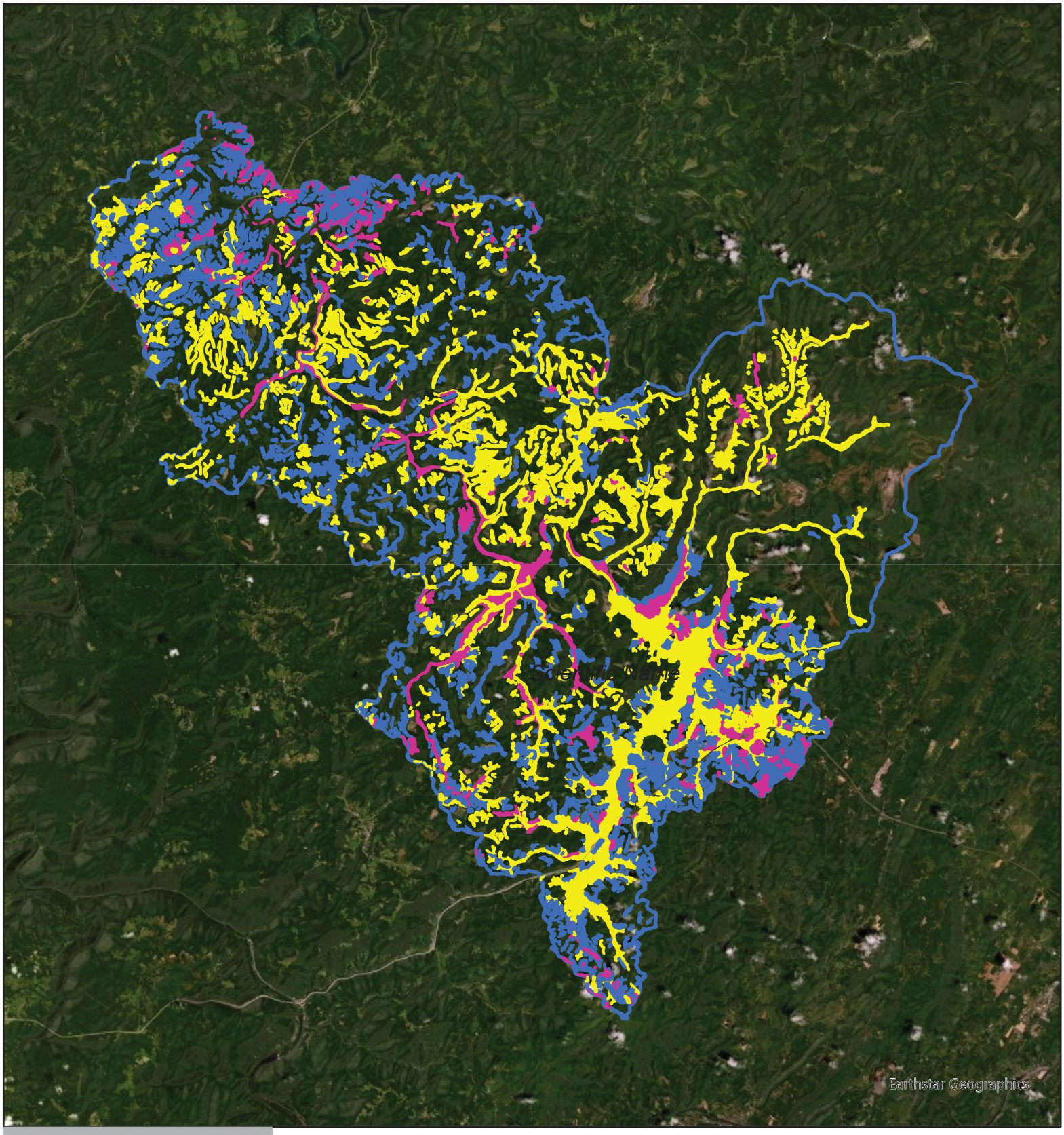
See the top communities overall »

Resources of Special Concern	
Clean Water Act	Permitted actions may involve or likely result in the discharge or placement of dredged or fill material in or other pollutants into waters of the US. Ephemeral, intermittent, and perennial streams and certain wetlands will be considered to be waters of the US. Mitigation for unavoidable impacts should be expected under Sec. 404 of the Clean Water Act.
Clean Air Act	The watershed is not in an area recognized for regularly having impaired air quality or significant air quality issues.
Coastal Zone Management	NA
Coral Reefs	NA
Cultural Resources	There are known cultural, archeological, and historically significant resources throughout the watershed. Consultation with Tribal Nations, West Virginia State Historic Preservation Officer, and other interested parties with vested interests in a yet to be determined area of potential effect will be conducted according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.
Endangered & Threatened Species	There is a total of 15 Federally listed threatened, endangered, or candidate species potentially found in this watershed by the US Fish and Wildlife Service. According to West Virginia Department of Natural Resources, WV is a permanent home to 22 federally endangered species (17 animals, 4 plants) and 7 federally threatened species (5 animals, 2 plants). WVDNR's State Wildlife Action Plan (SWAP) recognizes 22 Conservation Focus Areas (CFA) throughout the state that includes Species of Greatest Conservation Need (SGCN). See Appendix G for a complete USFWS IPaC Species list, WVDNR state listings, a map of WV CFAs, and a list of SGCN for this watershed.

Environmental Justice	Environmental justice seeks fair treatment and meaningful involvement of all people and requires the identification of any disproportionately high and adverse effects from a proposed project on protected groups. Greenbrier, Fayette, Nicholas, and Summers Counties is completely within the Appalachian Region. These counties are not designated as limited resource counties by USDA. However, Greenbrier County is designated as 'at risk' by the Appalachian Regional Commission, indicating that local economy is not strong. Fayette, Nicholas, and Summers Counties are designated 'distressed' indicating the local economies are challenged. https://www.arc.gov/distressed-designation-and-county-economic-status-classification-system/ All counties in the Meadow River watershed are predominately white, with 95% or more of the residents in this classification. The poverty rate is 17.8% for Greenbrier, 21% for Fayette, 19% for Nicholas, and 24.8% for Summers, which are high compared to the state and national statistics. https://www.census.gov/quickfacts
Essential Fish Habitat	NA

Floodplain Management	The purpose of floodplain management is to reduce flood damage. Floodplain management is the operation of community programs for preventative and corrective measures. These measures take a variety of forms and generally include zoning, division or building requirements, and special-purpose floodplain ordinances. Communities agree to adopt and enforce floodplain management ordinances to make flood insurance available to home and business owners. To date, 55 counties and 214 communities in West Virginia have voluntarily adopted and are enforcing local floodplain management ordinances that provide flood loss reduction building standards for new and existing development Greenbrier, Fayette, Nicholas, & Summers Counties have a major risk of flooding over the next few decades. In addition to damage on properties, flooding can impact access to utilities, emergency services, transportation, damage to agricultural lands and crops, and adversely impacts the overall well-being of both urban and rural communities located in the floodplain. For Greenbrier County there is a: -severe flooding risk to 4,277 of 16,432 residences -severe flooding risk to 1,230 out of 3,626 miles of roads -extreme risk of flooding to 469 out of 955 commercial properties -major risk of flooding to 24 out of 48 critical infrastructure facilities -major risk of flooding to 31 out of 86 social facilities For Nicholas County there is a: -major flooding risk to 2,698 of 11,619 residences -severe flooding risk to 1,040 out of 2,903 miles of roads -extreme risk of flooding to 275 out of 679 commercial properties -severe risk of flooding to 13 out of 26 critical infrastructure facilities -major risk of flooding to 15 out of 41 social facilities No similar data is readily available for Fayette & Summers Counties. Fayette & Summers County West Virginia both have adopted a Floodplain Ordinance. Fayette County adopted their Ordinance on 1/31/2018. Summers County adopted their ordinance on 10/7/2021. Greenbrier County, West Virginia Flood Factor® Report | Risk Factor
Invasive Species	Invasive species are found in the watershed. EDDMaps provides a web-based mapping system for documenting invasive species and pest distribution. According to USGS there is 1 nonindigenous aquatic species recorded in the watershed. See Appendix E for complete species lists. The lists are not specific to the watershed. However, they are based on a WV county level in which the watershed is located.

Migratory Birds/Bald & Golden Eagle Protection Act	Migratory birds and eagles utilize the Meadow River Watershed habitats. There is a total of 15 federally listed birds in the area. The birds listed are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the project location. See Appendix E for complete list.
Natural Areas	Federal: A portion of the Gauley River National Recreation Area is located in the northwest corner of the watershed and is managed by the National Park Service. The New River Gorge National Park, also managed by NPS, is located just outside of the watershed boundary to the southwest. State: The Meadow River Wildlife Management Area lies within the watershed near Rupert in Greenbrier County. Occupying 2,385 acres of river bottomland, the WMA is located along the Meadow River and consists mainly of wetlands habitat. Babcock State Park, Carnifex Ferry Battlefield State Park, Bruery Mountain WMA, and Summersville Lake WMA are located just outside of the watershed boundary. All are managed by the West Virginia Division of Natural Resources.
Prime and Unique Farmlands	Presently there are 8,756 acres of Prime Farmland, which accounts for 4% of land in the study area. Additionally, there are 32,043 acres of Farmland of Local Importance and 29,616 acres of Farmland of Statewide Importance. Farmland protection boards are actively conserving land in the watershed. The threat of conversion in the entire watershed, however, is not drastic.
Riparian Area	There are riparian areas present in or near the project area. Riparian areas found in this region are generally characterized as vegetated and un-vegetated. These areas are often utilized for agricultural, woodland, or residential purposes.
Scenic Beauty	Areas of potential scenic beauty in this watershed are typical of the Allegheny Mountain physiographic region.
Wetlands	There are 11,206 acres of wetlands within the Meadow River Watershed which consist of the following: 2,274 acres of Freshwater Emergent Wetlands; 4,659 acres of Freshwater Forested/Shrub Wetlands; 597 acres of Freshwater Pond; 29 acres of Lake; 838 acres of other; and 2,809 acres of Riverine. Data collected from the US Fish and Wildlife Service National Wetlands Inventory.
Wild and Scenic Rivers	All trout streams are designated as "Waters of Special Concern in Fayette, Greenbrier, and Nicholas counties. The Meadow River from near the US19 bridge to its junction with the Gauley River is designated as a WV Critical Resource Water.



Legend

FARMLNDCL

- All areas are prime farmland
- Farmland of local importance
- Farmland of statewide importance

Meadow River Watershed Farmland Classification

N

W E

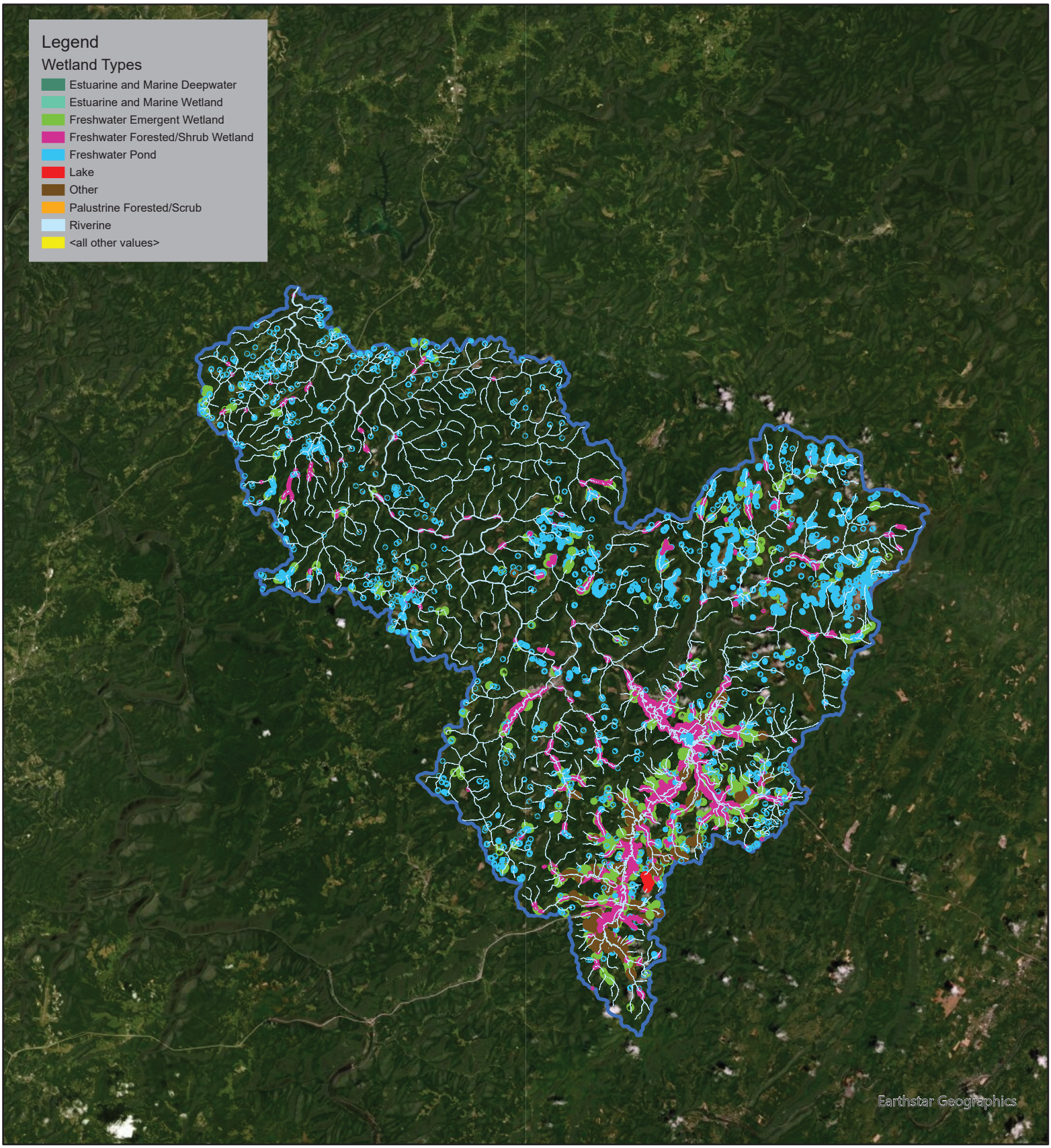
S

0 1 2 4 6 8

Kilometers

USDA is an equal provider, employer, and leader

USDA



Meadow River Watershed
National Wetlands Inventory

N
W E
S

0 2 4 7 11 14
Kilometers

USDA is an equal provider, employer, and leader

USDA

Proposed Project Purpose and Need Statement

The purpose of the proposed project is to address resource concerns in the Meadow River Watershed where residents of small communities, including the town of Rainelle, experience flooding, agricultural water management issues, and other resource concerns. It is anticipated that the PL 566 project purpose will be watershed protection, flood prevention, and agricultural water management.

Resource Concerns and Opportunities

The Federal Objective or the goal for the planning study according to the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G) is a water resources project that reflects national priorities, protects the environment, and encourages economic development. The Meadow River watershed contains water resources concerns and opportunities that offer the potential for a watershed project that achieves the Federal Objective.

Resources	**Concerns**	**Opportunities**
Water	• Flooding • Impact of excessive nutrients on surface waters	• Reduce flood impacts • Protect, improve water quality • Reduce erosion and sediment • Improve farming profitability • Enhance recreation • Improve nutrient management at farming operations
Soil	• Soil loss is likely due to OM depletion, compaction resulting in reduced infiltration on agricultural lands and urban lands, impervious surfaces. Erosion on farms is most likely from overgrazing and bare soil areas.	• Reduce impacts to soils and improve soil health
Air	• No air quality issues present	• Monitor state air data for potential issues
Plant	• Lack of plant species diversity and presence of invasive species.	• Increase of plant diversity with the establishment of native regionally appropriate species.

Animals	• Lack of game and non-game species diversity and habitat diversity	• Provide appropriate game and non-game habitat.
Energy	• Potential damage to energy infrastructure from flooding	• Efficiencies in energy use
Human	• Decreasing population due to diminishing living standards • Labor shortages and declining tax base	• Improvements to quality of life
Recreation	• Disparate recreational access • Underutilization of water-based recreation potential	• Increase accessibility to recreation for local residents • Increased water recreation opportunities that help overcome historical barriers to water-based recreation for aging and disabled populations • Continued stewardship of pristine trout streams. Improvement of trout streams that have streambank erosion or other impairments
Environmental Justice	• Flooding of low-income neighborhoods • Declining tax revenues for towns	• Overcome barriers to economic and human development
Cultural Resources / Historic Properties	• Full range of archaeological sites (Paleo-Indian to recent past) and historic properties eligible for listing on the National Registry of Historic Places	• Tribal and SHPO consultation

Potential Effects of Proposed Alternatives on SWAPA + E + H Resources and Resources of Special Concern

Use: *+ - Positive Impact - - Negative Impact 0 - No Impact*

(- effects for Alt 2 unknown at this stage)*

Resource Concerns: SWAPA + Energy + Human		
	Alt 1 – No Federal Action: Description: The sponsor does not implement any watershed measures using Federal funds	**Alt 2 – Federal Action:** Description: Combination of structural and nonstructural measures using federal funds
Soil	-	*
Water	-	*
Air	0	*
Plants	-	*
Animals	-	*
Energy	0	*
Human	-	*
Clean Air Act	0	*
Clean Water Act/Waters of the U.S.	0	*
Coastal Zone Management	0	0
Coral Reefs	0	0
Cultural Resources/Historic Properties	0	*
Endangered & Threatened Species	0	*
Environmental Justice	0	*
Essential Fish Habitat	0	0
Floodplain Management	0	*
Invasive Species	0	*
Migratory Birds/Bald and Golden Eagle Protection Act	0	*
Natural Areas	0	*

Opportunities

Opportunities exist to provide watershed protection, flood prevention, and agricultural water management. The sponsor is willing to participate in the PL-566 Watershed Program, allowing NRCS to potentially implement a combination of structural practices, non-structural practices, and land treatment measures that are designed to address resource concerns.

State, Tribal, Federal Stakeholder Engagement

Tribal Name	Date Sent
Catawba Indian Nation	8/1/2023
Cherokee Nation	8/1/2023
Eastern Band of Cherokee Indians	8/1/2023
Eastern Shawne Tribe of Oklahoma	8/1/2023
Monacan Indian Nation	8/1/2023

Potential Alternatives

During the PIFR process, broad categories of measures were identified to meet the stated purpose and need for the proposed project and alternatives were formulated according to PR&G criteria of completeness, effectiveness, efficiency, and acceptability. While all the potential alternatives listed may not be carried forward for full analysis during the planning process, this table documents that there are reasonable alternatives available to analyze and develop. The WV planning team also recognizes that during the planning process the NRCS team and local sponsors are likely to determine that the best alternative for the watershed is a combination of both nonstructural and structural measures.

Meadow River List of Alternatives

Alternatives	Possible Positive Impacts and Effects	Possible Adverse Impacts and Effects
Alt 1- No work	-No new costs to taxpayers or sponsors -No new maintenance requirements	-No flood protection -No public works project(s)
Alt 2-New Flood Control Dams- Installation of additional flood control dams in the watershed to increase flood protection. - Planning $900,000/each Plan - Design $800,000/each Design - Construction ~$15,000,000/each Site	-Increased flood protection -Recreation opportunities -Water supply, rural, ag, municipal, & industrial -Aquatic habitat -Short term construction jobs -Increased federal investment into local infrastructure -Increased public safety -Possible power generation capabilities included -Ag water management	-Loss of private land through condemnation/easements -Loss of local tax base -Loss of farmland and/or terrestrial habitat -Loss of stream habitat -Aquatic organism passage barrier -Long term maintenance burden on sponsors -Potential relocations of homes, roads, & utilities -May require some local cost share funds
Alt 3-New Flood Control Channel- Channelization work in heavier populated area of the watershed to increase flood protection - Planning $900,000/each Plan - Design $800,000/each Design - Construction ~$1,300,000/each Mile	-Increased flood protection in more urban areas -Short term construction jobs -Increased federal investment into local infrastructure -Reduce significant risk to loss of life -Provide maintenance easements alongside the constructed channel thus prohibiting future development in these areas and protecting existing urban wildlife habitat	-Loss of private land through condemnation/easements -Long term maintenance burden on sponsors -Potential relocations of utilities -May require some local cost share funds -Loss of stream habitat & riparian areas -May only reduce flooding from higher frequency storms
Alt 4 - Stream Restoration - Planning $50,000/each Plan/Design - Construction ~$396,000/each Mile	-Restoring stream and riparian habitat -Reduced long term maintenance cost -Short term construction jobs -Majority or all federal funds -Reduction in sediment and nutrients -Increased outdoor recreation -Relatively low cost -Improved water quality -Increase in fish and wildlife populations	-No flood protection -Requires a fenced and maintained Riparian area for cattle exclusion -Possible loss of pasture due to fencing

Alt 5 - Land Treatment - Planning $50,000/each Plan/Design - Construction ~$100/each Acre	-Restoring forests and ag land to their production potential -No long term maintenance cost -Majority or all federal funds -Reduction in sediment and nutrients -Increased outdoor recreation -Relatively low cost -Improved water quality -Increase in fish and wildlife populations -Typically voluntary programs	-No flood protection -No public works project(s)
Alt 6 - Green Infrastructure/Low Impact Development - Planning $100,000/each Plan - Design $100,000/each Design - Construction ~$200,000/each site	-Decreased flash flood events -Aquatic habitat uplift -Aesthetic improvements -Reduction in sediment and nutrients -Improved water quality -Permanent jobs maintaining structures	-Funds needed for maintenance -Minor loss of land -Maintenance burden on landowners/sponsors -Increased cost of development
Alt 7 - Land Treatment, Stream Restoration, Channelization, Green Infrastructure, New Structures	-Combination of all of the above -Huge amount of federal money provided -Several years of construction jobs -Improved flood protection, water quality, recreation, & water supply -Improved productivity on ag and forest land	-Combination of all of the above -Large amount of cost share required from local sponsors -Maintenance cost and burden increases

Facilitating Factors

The GVCD and the town of Rainelle are both to work with NRCS and each other to see the project through completion. The Meadow River watershed has been an area of interest for many years as flooding is prominent concern in the region.

Obstructing Factors

Local funding is dependent on state appropriations and local government budgets.

Environmental Document

Potentially viable alternatives to resource problems will be further defined in the next phase of planning. Additional needs such as recreation, watershed protection, or ag water management, will be assessed in more detail if planning is authorized. At this point in the planning process, the interdisciplinary team has determined that the Environmental Document for the project may be an Environmental Assessment. However, it is acknowledged that an Environmental Impact Statement could be required if significant or controversial issues arise during further planning.

Sponsors

The GVCD and the Town of Rainelle are ready, willing, and able to be sponsors for a potential watershed project in the Meadow River Watershed. They meet the PL 83-566 sponsorship criteria for this potential watershed project and have demonstrated success on past projects.

All sponsors who take an active role in project will complete the WS-4, PIFR Sponsor Declaration form. A summary of the sponsor responses will be included in this section. Completed WS-4 - PIFR Sponsor Declaration is included in Appendix B.

Sponsor Will:	Assist in Planning	Land Rights / Eminent Doman	Local Cost Share	O/M Funds	Permits	Land Treatment
Town of Rainelle	Yes	Yes	Yes	Yes	Yes	Yes

Sponsor will:

- Assist in the locally led planning effort.
- Obtain needed land rights including the use of power of eminent domain, if necessary.
- Provide local cost-share funds to provide the required portion of total project costs.
- Provide funds for continuing operation and maintenance actions.
- Obtain required permits and approvals at sponsor cost:
- Provide leadership to help ensure adequate conservation land treatment measures are maintained on at least 50% of the watershed area above retention reservoirs.

Potential Cooperating Agencies

Agency	Contact Information	Type of Involvement
US Army Corps of Engineers	USACE – Baltimore District Planning Division Regulatory Functions/Permits 2 Hopkins Plaza Baltimore, MD 21201 Planning: (401) 962-2809 Regulatory: (410) 962-3670	Regulatory [X]
		Informed [X]
		Prepare permits or letters of permission document [X]
		Provide input [X]
US Fish and Wildlife Services	USFWS 6263 Appalachian Highway Davis, WV 26260 501-513-4470 FW5_WVFO@fws.gov	Regulatory [X]
		Informed [X]
		Prepare permits or letters of permission document [X]
		Provide input [X]
West Virginia Department of Environment Protection (WVDEP)	WVDEP 601 57th Street SE Charleston, WV 25304 (304) 926-0499	Regulatory [X]
		Informed [X]
		Prepare permits or letters of permission document [X]
		Provide input [X]
USDA Farm Service Agency	USDA-FSA 1550 Earl Core Road Morgantown, WV 26505 (304) 284-4800	Regulatory [ ]
		Informed [X]
		Prepare permits or letters of permission document [ ]
		Provide input [ ]
West Virginia Historic Preservation Office (WVSHPO)	WVSHPO Capitol Complex 1900 Kanawha Boulevard, East Charleston, WV 25305-0300 (304) 558-0220	Regulatory [X]
		Informed [X]
		Prepare permits or letters of permission document [X]
		Provide input [X]

Potential Stakeholders

Stakeholder	Role	Resources	Contribution
Town of Rainelle	Sponsor	Cost-share funds	For Plan-EA attain permits and assists with public scoping meetings, mailings, and overall administration of the project
USDA-NRCS	Lead Agency for Plan-EA, FA/TA, Reviews	Funding assistance, Technical Reviews	Reviews for project location, inventory needs, Plan-EA supplement
Army Corps of Engineers (USACE)	Section 404 permit, Section 10 permit, and section 408 review	Technical Reviews, Wetlands-Waters of the U.S. Jurisdiction	Permitting, technical review
Catawba Indian Nation- Cultural Division Program Manager Caitlin Rogers	Permit-Cultural Review	Review of Project APE	Permit for Project APE
Catawba Indian Nation- THPO and Catawba Cultural Center Executive Director Dr. Wenonah G. Haire	Permit-Cultural Review	Review of Project APE	Permit for Project APE
Cherokee Nation- Tribal Historic Preservation Officer Elizabeth Toombs	Permit-Cultural Review	Review of Project APE	Permit for Project APE
Eastern Band of Cherokee Indians- Principal Chief Richard Sneed	Permit-Cultural Review	Review of Project APE	Permit for Project APE
Eastern Band of Cherokee Indians- Tribal Historic Preservation Specialist- Russell Townsend	Permit-Cultural Review	Review of Project APE	Permit for Project APE

Monacan Indian Nation- Chief Diane Shields	Permit-Cultural Review	Review of Project APE	Permit for Project APE
West Virginia Historic Preservation Program (WVSHPO)	Permit-Cultural Review	Review of Project APE	Permit for Project APE
WVDEP	Permits	Review for Permits	Review for Permits
WVDNR	Partner	Review of Plan – ED	Review of Plan - ED

Notifications

If a watershed plan – environmental assessment is undertaken, the NRCS must notify publish a notice of intent to the public and notify key federal and state agencies as described in the National Watershed Manual. (Executive Order 10584 Section 3).

Estimated Project Implementation Timeline Notifications

*Dependent on funding

Planning Start	October 2024
Planning End	October 2026
Design Start	December 2026
Design End	December 2027
Construction Start	March 2028
Construction End	November 2028

Recommendation

This preliminary investigation and feasibility report has been completed and submitted for approval to: Jeffrey Barr West Virginia Acting State Conservationist.

By:

Name: Christi_Hicks Title: Assistant State Conservationist Resources Date: : 10/18/2022

Organization: Natural Resources Conservation Service (NRCS)

Does	Does Not	
☒	☐	… meet the statutory acreage, volume/capacity of structure and recreational limit requirements;
☒	☐	… meet the requirements of one or more Watershed Operations authorized purposes;
☒	☐	… have the potential for a minimum of 20% agricultural, or rural, benefits;
☒	☐	… have one or more viable alternatives;
☒	☐	… have potential project sponsor(s) that meet and agree to all terms of responsibilities;
☐	☒	… have apparent insurmountable obstacles.

It has been determined that this potential PL-566 watershed operations project:

Preparers Signature Signature: HANNAH THACKER Digitally signed by HANNAH THACKER Date: 2024.01.30 09:47:40 -05'00' Date:

State Watershed Operations Program Manager Signature: CHRISTI HICKS Digitally signed by CHRISTI HICKS Date: 2024.01.30 10:39:55 -05'00' Date: 1/30/24

	Not recommended for planning funding
X	Accepted and recommended for Planning Funding

State Technical Lead (SRC, SCE, Other) Signature: LEWTON DEICHERT Digitally signed by LEWTON DEICHERT Date: 2024.02.05 15:06:02 -05'00' Date:

State Conservationist Signature: JEFFREY BARR Digitally signed by JEFFREY BARR Date: 2024.02.13 14:47:37 -05'00' Date: 2/13/2024

Glossary

Rural – All territories of a State that are not within the outer boundary of any city or town that has a population of 50,000 or more according to the latest decennial census of the United States (2010 Census Urban and Rural Classification and Urban Area Criteria). [Source Title 390 – NWPM Part 506.50 Glossary, MMM]

Appendix

- Appendix A: Sponsor Letter of Request
- Appendix B: WS-4 – PIFR Sponsor Declaration Forms
- Appendix C: Preliminary Environmental Evaluation (CPA 52)
- Appendix D: Forecasted NRCS Staffing Needs
- Appendix E: Supporting Information Appendix (T&E and Invasive Species)

Appendix A.
Sponsor Letter of Request

State Conservationist Jon Bourdon
Natural Resources Conservation Service
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

Dear State Conservationist Bourdon:

We request NRCS Watershed Program planning assistance for a potential Public Law (PL) 83-566 project in Greenbrier County in the Meadow River Watershed, hydrologic unit code (HUC) 0505000506. The town of Rainelle and surrounding area in the Meadow River watershed experience frequent flooding causing loss of life and damage to property. We would like for the NRCS to determine the feasibility of flood protection for the town and surrounding area. We may also be interested in water supply and recreation benefits if a flood control dam is feasible. We understand, as sponsors of a PL 83-566 planning effort, that our responsibilities will include:

- Assisting in the locally led planning effort,
- Contributing a share of the project costs, as determined by NRCS, by providing funds or eligible services necessary to undertake the activity,
- Before being credited with the value of any in-kind contributions for in-kind services and/or acquisition of land rights, Sponsor will sign a Memorandum of Understanding (MOU) with NRCS,
- Obtaining any necessary real property rights, by eminent domain, if necessary,
- Obtaining any needed water rights, and regulatory permits at the Sponsor's cost,
- Agreeing to provide for any required operation and maintenance of the completed measures.

We further understand that there is **no cost** share required for a feasibility report and that the Town will review and consider its future participation at every step.
We look forward to working with NRCS staff to complete a Preliminary Investigation Feasibility Report (PIFR) to provide reasonable assurance that a potential watershed project can be developed that addresses a PL 83-566 purpose and that there are no apparent insurmountable obstacles to the completion of that project.

The names, addresses, and telephone numbers of the administrative and technical contact persons in our organization are as follows:

Mayor..... Robin Williams 1233 Kanawha Ave. Rainelle, WV 25962
304-438-2191 ext. 102

City Manager.....

Please contact them for any additional information that you might need in assessing our request.

Sincerely, Mayor Robin Williams

cc:
Don Dodd, Watershed Planning Specialist, USDA Natural Resources Conservation Service, Beckley, WV
Pam Yost, Watershed Economist, USDA Natural Resources Conservation Service, Morgantown, WV

Appendix B.

PIFR Sponsor Declaration Forms

Watershed Programs Standard Memorandum
Preliminary Investigation – Feasibility Report
Sponsor Authority and Role Declaration

Form Number: WS-4
Version 2021-03-04

State: WV County: Greenbrier, Fayette, Nicholas and Summers Watershed: Meadow River

Project Name: MEADOW RIVER WATERSHED

Sponsor's Name:	**TOWN OF RAINELLE**		
Sponsor's Mailing Address:	**PO BOX 648, RAINELLE WV 25962**		
Contact Name:	**ROBIN WILLIAMS**	**Phone:**	**304-438-7191**
Title:	**Mayor of Rainelle**	**Email:**	rainelletownclerk@gmail.com
Sponsor Website:	**https://www.citydirectory.us/town-rainelle.html**		

Description of the existing condition in the watershed that would be addressed through a Watershed Flood Prevention Operations program project.

Frequent flooding occurs in the Meadow River Watershed. The flooding causes severe damages to neighborhood areas, crops. and infrastructure located in the floodplain. Sediment laden runoff on the surrounding areas is reducing the capacity of the creeks and drainage ditches to carry flood flows. Previously completed watershed projects are past their service life and O&M obligations and aren't functioning to full design capabilities. There is a need to provide reduction in floodwater damages and sediment being delivered into the Meadow River Watershed.

Potential benefits of a Watershed Flood Prevention Operations program project.

Benefits of a project could provide watershed protection and agricultural water management by reducing floodwater damages, erosion and sediment loading to intensified agricultural areas, residential, and infrastructure in the Meadow River Watershed located in Greenbrier, Fayette, Nicholas and summers County.

SPONSOR WIL

Watershed Programs Standard Memorandum
Preliminary Investigation – Feasibility Report
Sponsor Authority and Role Declaration

Form Number: WS-4
Version 2021-03-04

State: WV County: Greenbrier, Fayette, Nicholas and Summers Watershed: Meadow River

Project Name: MEADOW RIVER WATERSHED

- Assist in the locally led planning effort: YES ✓ NO ____
- Obtain needed land rights including the use of power of eminent domain, if necessary: YES ✓ NO ____
- Provide local cost-share funds and/or in-kind services to provide the required portion of total project costs: YES ✓ NO ____
- Provide Funds for continuing Operation and Maintenance actions: YES ✓ NO ____
- Obtain required permits and approvals at Sponsor cost: YES ✓ NO ____
- Provide leadership to help ensure adequate conservation land treatment measures are maintained on at least 50% of the watershed area above retention reservoirs: N/A ✓ YES ____ NO ____
- Before being credited with the value of any in-kind contribution for any in-kind services and/or acquisition of land rights, Sponsor will sign a Memorandum of Understanding (MOU) with NRCS: YES ✓ NO ____

Authorized Representative of Sponsor

Name (printed): Mayor Robin Williams **Title:** Mayor

Signature: Mayor Robin Williams **Date:** 1·12·2023

Specific Watershed Programs information can be found at: https://usdagcc.sharepoint.com/sites/nrcs_programs/watershed/

Appendix C.

Preliminary Environmental Evaluation (CPA 52)

U.S. Department of Agriculture — NRCS-CPA-52
Natural Resources Conservation Service — 11/2019

ENVIRONMENTAL EVALUATION WORKSHEET

A. Client Name: Town of Rainelle, WV

B. Conservation Plan ID # (as applicable): Meadow River PIFR
Program Authority (optional): PL-566

D. Client's Objective(s) (purpose):
The purpose of this project is to provide watershed protection and agricultural water management by reducing flood water damages, erosion and sedimentation loading in the Meadow River Watershed.

C. Identification # (farm, tract, field #, etc. as required):
Meadow River Watershed,
Greenbrier, Fayette, Nicholas, and Summers County, WV
10-digit HUC (0505000506)

E. Need for Action:
The baseline condition without federal investment is a of flood protection, incidental recreation, rural water supply , and other amenities associated with impoundments. Flooding is persistent and results in loss of property and crops, stream bank erosion, and sedimentation of streams.

H. Alternatives

No Action √ if RMS ☐	*Alternative 1* √ if RMS ☐	*Alternative 2* √ if RMS ☐
Flooding, sedimentation, and erosion would continue to be an issue for residents. As problems persist, land values, decreasing popluation, and land degradation would continue. Water supply would still be a concern for local residents. There would be no additional federal funds expended with this alternative	New Flood Control Dams- Installation of flood control dams in the watershed to increase flood protection. Focused funding for technical and financial assistance through the Watershed Protection and Flood Prevention Act would result in reduced sedimentation, improved water quality, protection of prime farmland, and reduce flooding in the Meadow River Watershed.	New Flood Control Channel- Channelization work in more heavily populated areas of the watershed to increase flood protection. Focused funding for technical and financial assistance through the Watershed Protection and Flood Prevention Act would result in reduced sedimentation, improved water quality, protection of prime farmland, and reduce significant loss of life in the Meadow River Watershed.

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process. (See FOTG Section III - Resource Planning Criteria for guidance).

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)

I. Effects of Alternatives

	No Action		*Alternative 1*		*Alternative 2*	
	Amount, Status, Description *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**
SOIL						
Sheet and rill erosion Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further exasperating flood damages.	Continued degradation of the resource without any federal action.	☐ NOT meet PC	Increased flood control and holding capacity would decrease sediment loading within streams and reduce flooding impacts on stream bank erosion due to reduced flows.	☐ NOT meet PC	Channelization would reduce streambank erosion and sedimentation by protecting adjacent streambanks.	☐ NOT meet PC
WATER						
Ponding and flooding Flooding has been a historical issue in the watershed with the expected risk of flooding increasing over the next few decades as storms become more frequent and severe, and as the infrastructure ages. Flooding is a threat to property, access to utilities, emergency services, transportation, agricultural land, and crops.	Residences, businesses, and agricultural lands would continue to endure periodic flooding as storm frequency and intensity trends continue.	☐ NOT meet PC	Increased flood protection provided by installation of flood retention dams would reduce impacts of flooding within the watershed.	☐ NOT meet PC	Channelization would reduce the risk of flooding in more urban areas.	☐ NOT meet PC

Sediment transported to surface water Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further exasperating flood damages. Floodplain scour of adjacent floodplains also increase the sediment load of floodwaters during flood events.	Resources would continue to be degredated. Frequent flooding will continues to scour streambanks, increasing sedimentation within streams and reducing channel capacity.	☐ NOT meet PC	Increased flood control and holding capacity would decrease sediment loading within streams and reduce flooding impacts on stream bank erosion due to reduced flows.	☐ NOT meet PC	Channelization would reduce streambank erosion and sedimentation by protecting adjacent streambanks.	☐ NOT meet PC
Nutrients transported to surface water Water quality is negatively affected by nutrients, failing septic systems, and runoff from rural landscapes within the watershed. Many streams within the watershed have elevated levels of fecal coliform from pasture/cropland, failing septic systems, and residential stormwater sources.	Continued degradation of the resource without any federal action.	☐ NOT meet PC	Increased flood protection provided by constrution of flood retention dams would reduce impacts of flooding within the watershed. The risk of flood waters entering homes, businesses, and livestock feeding operations causing debris and other nutrients transported down the watershed would be reduced.	☐ NOT meet PC	The creation of the channel would likely result in the need for flood plain easements on properties adjacent to the streams that may not have functioning septic systems, thus reducing the fecal coliform in the stream.	☐ NOT meet PC

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	**I. (continued)**					
	No Action		***Alternative 1***		***Alternative 2***	
	Amount, Status, Description *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**
AIR						
No resource concern identified Air quality is not currently a resource concern in the watershed.	Air quality would not be impacted with no action.	☐ NOT meet PC	Air quality may be slightly adversely impacted locally during construction activities (dust and exhaust from construction equipment). The increases are expected to remain well within the air quality standards and would be temporary.	☐ NOT meet PC	Air quality may be slightly adversely impacted locally during construction activities (dust and exhaust from construction equipment). The increases are expected to remain well within the air quality standards and would be temporary.	☐ NOT meet PC
PLANTS						
Plant structure and composition The watershed provides for both agricultural crops as well as naturally vegetated areas that provide wildlife habitat. There is a lack of plant species diversity, specifically along streams in riparian areas, and a presence of invasive species.	Agricultural crops and wildlife habitat would continue to be impacted by flooding.	☐ NOT meet PC	Agricultural crops and wildlife habitat would be enhanced from a reduction in flooding and decrease in sedimentation.	☐ NOT meet PC	Agricultural crops and wildlife habitat would be enhanced from a reduction in flooding and decrease in sedimentation.	☐ NOT meet PC
ANIMALS						
Terrestrial habitat for wildlife and invertebrates Game and non-game species of wildlife are found within the watershed, however habitat is not ideal. There are 15 threatened, endangered, or candidate species found in the watershed.	Wildlife will continue to be temporarily displaced during flood events. Changing vegetation along stream banks due to flood damage will continue to support invasive species over native, thus reducing the quality of wildlife habitat, food and shelter.	☐ NOT meet PC	Displacement of wildlife due to excessive flooding within the watershed would likely decrease. Habitat that supports this wildlife would be less likely to be disturbed and thus reduce the spread of invasive species. Terrestrial habitat would be disturbed in the short term due to construction.	☐ NOT meet PC	Channelization could result in a loss of riparian areas in some locations, but provide wildlife habitat in more urban areas through the removal of structures along the stream and future protection of the areas through conservation easements.	☐ NOT meet PC

Aquatic habitat for fish and other organisms Sedimentation and nutrients are negatively effecting aquatic fish and invertebrate species habitat.	Continued degradation of the resources with continued sedimentation in the stream negatively impacting aquatic invertebrate habitat.	☐ NOT meet PC	Aquatic habitat would be improved downstream of structures due to reduced sedimentation. Dams could pose a threat to aquatic habitat by restricting passage, depending on location in the watershed.	☐ NOT meet PC	Potential to negatively impact stream structure and habitat for aquatic species. Riparian areas could be decrease in some areas but enhanced in others though the removal of structures along stream and future protection of the areas through conservation easements.	☐ NOT meet PC
ENERGY						
No resource concern identified This area has various electrical, oil, and gas transmission facilities. Coal mines, both surface and deep mines, are present within the watershed.	No effect	☐ NOT meet PC	Hydroelectric power generation could be included as an element in the design of the structures to provide clean energy to the region.	☐ NOT meet PC	No effect	☐ NOT meet PC
Human Economic and Social Considerations						
Public Health and Safety Damaging floods occur on an annual basis with increasing severity over the past few decades. Flooding impacts residents' access to emergency services, results in loss of land, and creates unsanitary conditions in effected residences and businesses.	Agricultural landowners, residents, local businesses, transportation systems, and emergency services will continued to be negatively affected by continued flooding.		Installation of structures would increase flood protection of the counties' residences and business. It would also provide the opportunity for rural water supply, recreation opportunities, and a short term creation of jobs during construction.		Channelization would increase flood protection in more urban areas, create short term jobs during construction, and reduce significant risk to loss of life, however it may only reduce flooding from higher frequency storm events.	

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.

In Section "G" complete and attach Environmental Procedures Guide Sheets for documentation as applicable. Items with a "●" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.

G. Special Environmental Concerns (Document existing/ benchmark conditions)	**J. Impacts to Special Environmental Concerns**					
	No Action		***Alternative 1***		***Alternative 2***	
	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action
●Clean Air Act *Guide Sheet* The watershed is not in an area recognized for regularly having impaired air quality or significant air quality issues.	No Effect	☐	May Affect It is likely that no permitting or authorization is necessary. The activity is expected to only have minor local impacts to air quality during construction and would not be expected to violate standards. Advise the client to contact the appropriate air quality regulatory agency for verification.	☐	May Affect It is likely that no permitting or authorization is necessary. The activity is expected to only have minor local impacts to air quality during construction and would not be expected to violate standards. Advise the client to contact the appropriate air quality regulatory agency for verification.	☐
●Clean Water Act / Waters of the U.S. *Guide Sheet* Permitted actions may involve or likely result in the discharge or placement of dredged or fill material in or other pollutants into waters of the US. Ephemeral, intermittent, and perennial streams and certain wetlands will be considered as waters of the US. Mitigation for unavoidable impacts should be expected under Sec. 404 of the Clean Water Act.	No Effect	☐	May Affect Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation for stream impacts may also be required.	☐	May Affect Installation of any structures within the stream that will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation for stream impacts may also be required.	☐

●Coastal Zone Management *Guide Sheet* There are no costal zones present in or near the watershed.	No Effect	☐	No Effect	☐	No Effect	☐
Coral Reefs *Guide Sheet* There are no coral reefs present in or near the watershed.	No Effect	☐	No Effect	☐	No Effect	☐
●Cultural Resources / Historic Properties *Guide Sheet* There are known cultural, archeological, and historically significant resources throughout the watershed. Consultation with Tribal Nations, West Virginia State Historic Preservation Officer, and other interested parties with vested interests in a yet to be determined area of potential effect will be conducted according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	No Effect	☐	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐
●Endangered and Threatened Species *Guide Sheet* There is a total of 15 Federally listed threatened, endangered, or candidate species potentially found in this watershed listed by the US Fish and Wildlife Service (USFWS). According to West Virginia Department of Natural Resources (WVDNR), WV is a permanent home to 22 federally endangered species (17 animals, 4 plants) and 7 federally threatened species (5 animals, 2 plants). WVDNR's State Wildlife Action Plan (SWAP) recognizes 22 Conservation Focus Areas (CFA) throughout the state that includes Species of Greatest Conservation Need (SGCN). See Appendix E for a complete USFWS IPaC Species list, WVDNR state listings, map of WV CFAs, and a list of SGCN for this watershed.	No action may have the potential to negatively impact federally listed aquatic species through continued sedimentation and habitat destruction.	☐	May Affect The structural alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Federal, state, and local wildlife agencies will be consulted prior to construction.	☐	May Affect The structural alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Federal, state, and local wildlife agencies will be consulted prior to construction.	☐

Environmental Justice *Guide Sheet* Greenbrier County is designated as 'at risk' by the Appalachian Regional Commission, indicating that local economy is not strong. Fayette and Nicholas Counties are designated 'distressed' indicating the local economies are challenged. All counties in the Meadow River watershed are predominately white, with 95% or more of the residents in this classification. The poverty rate is 17.8% for Greenbrier, 21% for Fayette, and 19% for Nicholas, which are high compared to the state and national statistics.	No Effect	☐	No Effect No negative impacts are anticipated. The project would benefit historically underserved residents, landowners, and communities.	☐	No Effect No negative impacts are anticipated. The project would benefit historically underserved residents, landowners, and communities.	☐
●Essential Fish Habitat *Guide Sheet* This area is not designated as Essential Fish Habitat.	No Effect	☐	No Effect	☐	No Effect	☐
Floodplain Management *Guide Sheet* There is a major risk of flooding within the watershed over the next few decades.	No Effect Continued risk of flooding.	☐	May Affect This alternative will result in the protection of the floodplain due to decreased flooding impacts.	☐	May Affect This alternative will result in the protection of the floodplain due to decreased flooding impacts	☐
Invasive Species *Guide Sheet* Invasive species are found in the watershed.	No Effect Continued expansion on invasive species.	☐	May Affect Invasive species occur within the watershed. Care would be taken not to introduce invasive species in disturbed areas.	☐	May Affect Invasive species occur within the watershed. Care would be taken not to introduce invasive species in disturbed areas.	☐
●Migratory Birds/Bald and Golden Eagle Protection Act *Guide Sheet* Migratory birds and eagles utilize the Meadow River Watershed habitats. There is a total of 15 federally listed birds in the area. The birds listed are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the project location.	No Effect	☐	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐

Natural Areas *Guide Sheet* Federal: A portion of the Gauley River National Recreation Area is located in the northwest corner of the watershed and is managed by the National Park Service. The New River Gorge National Park, also managed by NPS, is located just outside of the watershed boundary to the southwest. State: The Meadow River Wildlife Management Area lies within the watershed near Rupert in Greenbrier County. Occupying 2,385 acres of river bottomland, the WMA is located along the Meadow River and consists mainly of wetlands habitat. Babcock State Park, Carnifex Ferry Battlefield State Park, Bruery Mountain WMA, and Summersville Lake WMA are located just outside of the watershed boundary. All are managed by the West Virginia Division of Natural Resources.	No Effect	☐	No Effect	☐	No Effect	☐
Prime and Unique Farmlands *Guide Sheet* Presently there are 8,756 acres of Prime Farmland, which accounts for 4% of land in the study area. Additionally, there are 32,043 acres of Farmland of Local Importance and 29,616 acres of Farmland of Statewide Importance. Farmland protection boards are actively conserving land in the watershed. The threat of conversion in the entire watershed, however, is not drastic.	No Effect Continued potential threat to loss of prime farm land from streambank erosion.	☐	No Effect Alternative would provide protection of prime farmland through the reduction of streambank erosion.	☐	No Effect Alternative would provide protection of prime farmland through the reduction of streambank erosion.	☐
Riparian Area *Guide Sheet* There are riparian areas present in or near the project area. Riparian areas found in this region are generally characterized as vegetated and un-vegetated. These areas are often utilized for agricultural purposes.	No Effect Continued degradation of riparian land as streambanks erode and invasive species dominate regrowth.	☐	May Affect There are riparian areas present in or near the project area and may have the potential to be impacted.	☐	May Affect There are riparian areas present in or near the project area and may have the potential to be impacted.	☐
Scenic Beauty *Guide Sheet* Areas of potential scenic beauty in this watershed are typical of the Allegheny Mountain physiographic province and common to the region.	No Effect	☐	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐

●Wetlands *Guide Sheet* There are 11,206 acres of wetlands within the Meadow River Watershed which consist of the following: 2,274 acres of Freshwater Emergent Wetlands; 4,659 acres of Freshwater Forested/Shrub Wetlands; 597 acres of Freshwater Pond; 29 acres of Lake; 838 acres of other; and 2,809 acres of Riverine.		No Effect	☐		No Effect Action is not likely to negatively impact any wetlands in the watershed.	☐	No Effect Action is not likely to negatively impact any wetlands in the watershed.	☐
●Wild and Scenic Rivers *Guide Sheet* All trout streams are designated as "Waters of Special Concern in Fayette, Greenbrier, and Nicholas counties. The Meadow River from near the US19 bridge to its junction with the Gauley River is designated as a WV Critical Resource Water.		No Effect	☐		No Effect	☐	No Effect	☐
K. Other Agencies and Broad Public Concerns		***No Action***			***Alternative 1***		***Alternative 2***	
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.		None			Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation may also be required.		New Flood Control Channel-Channelization work in more heavily populated areas of the watershed to increase flood protection.	
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)		Absent the proper and increased application of conservation practices, cumulative effects will likely lead to continued environmental degradation.			Installation of flood control dams would increase flood protection for the community, provide recreational opportunities, and potentially supply water and energy. There would be increase burden on local sponsors for maintenance and cost share would be required from the sponsor.		Channelization of streams would increase flood protection for the more urban sections of the community. There would be increase burden on local sponsors for maintenance and cost share would be required from the sponsor.	
L. Mitigation (Record actions to avoid, minimize, and compensate)		None			Mitigation would likely be required for the length of streams impacted by construction of new impoundments. Vegetation will be established on disturbed areas immediately following construction to a vegetative plan developed conjunction with NRCS and local sponsors.		Mitigation could be required for the length of streams impacted by the channel. Vegetation will be established on disturbed areas immediately following construction to a vegetative plan developed conjunction with NRCS and local sponsors.	
M. Preferred Alternative	√ preferred alternative	☐			☐		☐	
	Supporting reason				Installation of additional flood control dams in the watershed to increase flood protection.		Installation of flood control channel in more heavily populated areas in the watershed to increase flood protection.	
N. Context (Record context of alternatives analysis)		local			local		local	
The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.								

U.S. Department of Agriculture — NRCS-CPA-52
Natural Resources Conservation Service — 11/2019

ENVIRONMENTAL EVALUATION WORKSHEET

A. Client Name: Town of Rainelle, WV

B. Conservation Plan ID # (as applicable): Meadow River PIFR
Program Authority (optional): PL-566

D. Client's Objective(s) (purpose):
The purpose of this project is to provide watershed protection and agricultural water management by reducing flood water damages, erosion and sedimentation loading in the Meadow River Watershed.

C. Identification # (farm, tract, field #, etc. as required):
Meadow River Watershed,
Greenbrier, Fayette, Nicholas, and Summers County, WV
10-digit HUC (0505000506)

E. Need for Action:
The baseline condition without federal investment is a of flood protection, incidental recreation, rural water supply , and other amenities associated with impoundments. Flooding is persistent and results in loss of property and crops, stream bank erosion, and sedimentation of streams.

H. Alternatives

Alternative 3 √ if RMS ☐	*Alternative 4* √ if RMS ☐	*Alternative 5* √ if RMS ☐
Natural Stream Restoration would restore the stream and riparian habitat to its natural function. Watershed Protection and Flood Prevention Act funding in conjunction with traditional Farm Bill programs, such as EQIP or NWQI, would focus technical and financial assistance to install practices typically associated with natural stream restoration.	Land Treatment- Conservation practice installation across all landuses to prevent soil loss, improve wildlife habitat, and improve water quality. Watershed Protection and Flood Prevention Act funding in conjunction with traditional Farm Bill programs, such as EQIP or NWQI, would focus technical and financial assistance to install practices typical for the region.	Green Infrastructure/Low Impact Development- Adaptation of practices such as wetland management/creation, rain gardens, pervious concrete, and tree plantings to assist the watershed in its capacity to handle flood waters. Technical and/or financial assistance could be available through Conservation Technical Assistance (CTA), traditional Farm Bill programs such as EQIP and NWQI, and local sponsors.

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process. (See FOTG Section III - Resource Planning Criteria for guidance).

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	**I. Effects of Alternatives**					
	Alternative 3		***Alternative 4***		***Alternative 5***	
	Amount, Status, Description *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**
SOIL						
Sheet and rill erosion Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further flood damages.	No effect to upland erosion. Sedimentation caused by stream bank erosion would be decreased by the stabilization of streambanks.	☐ NOT meet PC	Forest stand improvement, prescribed grazing and associated practices, cover crop, reduced tillage, and other related land treatment practices typical for the region would decrease sheet and rill erosion on upland slopes and decrease sedimentation in the stream.	☐ NOT meet PC	Reduction in soil erosion from reduced velocities of water conveyance during high rain events.	☐ NOT meet PC
WATER						
Ponding and flooding Flooding has been a historical issue in the watershed with the expected risk of flooding increasing over the next few decades as storms become more frequent and severe, and as the infrastructure ages. Flooding is a threat to property, access to utilities, emergency services, transportation, agricultural land, and crops.	Natural stream restoration could increase the channel's capacity to hold flood waters.	☐ NOT meet PC	Proper management of upland slopes would reduce erosion and sedimentation in the stream. sedimentation. This would allow the stream to maintain its capacity and thus reduce flooding impacts.	☐ NOT meet PC	Flooding would be mitigated through installation of green infrastructure by increasing the water holding capacity and natural functions of wetlands and installation of rain gardens. The infrastructure would reduce damages caused by flash flood events.	☐ NOT meet PC

Sediment transported to surface water Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further exasperating flood damages. Floodplain scour of adjacent floodplains also increase the sediment load of floodwaters during flood events.	There would be a reduction in sediments entering the watershed. Water quality would be beneficially effected and result in more outdoor recreation opportunities.	☐ NOT meet PC	There would be a reduction in sediments entering the watershed. Water quality would be beneficially effected and result in more outdoor recreation opportunities.	☐ NOT meet PC	Reduction in sediment entering the watershed and the watershed due to reduced velocities of water conveyance during high rain events.	☐ NOT meet PC
Nutrients transported to surface water Water quality is negatively affected by nutrients, failing septic systems, and runoff from rural landscapes within the watershed. Many streams within the watershed have elevated levels of fecal coliform from pasture/cropland, failing septic systems, and residential stormwater sources.	There would be a reduction of nutrients in surface water with the exclusion of livestock from the stream in conjunction with natural stream and riparian area restoration.	☐ NOT meet PC	There would be a reduction of nutrients in surface water with the installation of conservation practices such as Nutrient Management, Prescribed Grazing, and Access Control.	☐ NOT meet PC	Enhancements and installation of wetlands and other green infrastructure can reduce nutrients transported to surface water within the local watershed as well as the watershed	☐ NOT meet PC
F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	**I. (continued)** ***Alternative 3*** **Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	***Alternative 4*** **Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	***Alternative 5*** **Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**
AIR						
No resource concern identified Air quality is not currently a resource concern in the watershed.	No effect	☐ NOT meet PC	Localized odors and particulate matter concerns could be addressed through conservation practices such as Waste Storage Facilities or Windbreaks/Shelterbelts.	☐ NOT meet PC	No effect	☐ NOT meet PC
PLANTS						
Plant structure and composition The watershed provides for both agricultural crops as well as naturally vegetated areas that provide wildlife habitat. There is a lack of plant species diversity, specifically along streams in riparian areas, and a presence of invasive species.	Improved riparian areas will provide more naturally occurring plant species. Fencing streams and restoration of riparian areas could result in a loss of pasture or crop land.	☐ NOT meet PC	Plant structure and composition would benefit from properly managed grazing (Prescribed Grazing and associated practices) as well as through implementation of Forest Stand Improvement in the watershed.	☐ NOT meet PC	Plant structure and composition would be improved through the installation of green infrastructure- wetlands, rain gardens, tree plantings, etc.	☐ NOT meet PC
ANIMALS						
Terrestrial habitat for wildlife and invertebrates Game and non-game species of wildlife are found within the watershed, however habitat is not ideal. There are 15 threatened, endangered, or candidate species found in the watershed.	Terrestrial habitat would be improved through the creation of riparian areas.	☐ NOT meet PC	Terrestrial wildlife habitat would be improved through proper livestock grazing in pastures, invasive species control across all landuses, and implementation of forest stand improvement in woodlands.	☐ NOT meet PC	Terrestrial habitat would be improved through the installation of green infrastructure- wetlands, rain gardens, tree plantings, etc.	☐ NOT meet PC

Aquatic habitat for fish and other organisms Sedimentation and nutrients are negatively effecting aquatic fish and invertebrate species habitat.	Aquatic habitat would be improved by installing practices return the streambed to a more natural value and function.	☐ NOT meet PC	Aquatic habitat would be improved by the reduction in sedimentation of the stream caused by upland soil erosion through the installation of conservation practices typical of the region.	☐ NOT meet PC	Aquatic habitat would be improved by the reduction and sedimentation of stream caused by high velocities of water during storm events. Aquatic habitat would also benefit from enhancement and installation of wetlands.	☐ NOT meet PC
ENERGY						
No resource concern identified This area has various electrical, oil, and gas transmission facilities. Coal mines, both surface and deep mines, are present within the watershed.	No effect	☐ NOT meet PC	No effect	☐ NOT meet PC	Existing structures could be retrofitted for hydroelectricity production.	☐ NOT meet PC
Human Economic and Social Considerations						
Public Health and Safety Damaging floods occur on an annual basis with increasing severity over the past few decades. Flooding impacts residents' access to emergency services, results in loss of land, and creates unsanitary conditions in effected residences and businesses.	While this alternative does not provide substantial, additional protection from flooding and risk of loss of life, it would create opportunities for increased outdoor recreation that is associated with healthy streams. Implementation of this alternative would likely reduce erosion, sedimentation, and flooding of roads and bridges, resulting in increased safety for the public and reduction in maintenance activates. There would also be less disruptions to regular traffic, as well as emergency vehicles.		While this alternative does not provide substantial, additional protection from flooding and risk of loss of life, it would create opportunities for increased outdoor recreation that is associated with healthy streams. Implementation of this alternative would likely reduce erosion, sedimentation, and flooding of roads and bridges, resulting in increased safety for the public and reduction in maintenance activates. There would also be less disruptions to regular traffic, as well as emergency vehicles.		This alternative would provide a reduction of damages from flash flooding events resulting in loss of life and transportation disruptions.	

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.

In Section "G" complete and attach Environmental Procedures Guide Sheets for documentation as applicable. Items with a "●" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.

G. Special Environmental Concerns (Document existing/ benchmark conditions)	**J. Impacts to Special Environmental Concerns**					
	Alternative 3		***Alternative 4***		***Alternative 5***	
	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action
●Clean Air Act *Guide Sheet* The watershed is not in an area recognized for regularly having impaired air quality or significant air quality issues.	May Affect It is likely that no permitting or authorization is necessary. The activity is expected to only have minor local impacts to air quality during construction and would not be expected to violate standards. Advise the client to contact the appropriate air quality regulatory agency for verification.	☐	No Effect Land treatment practices are not likely to negatively effect air quality.	☐	May Affect It is likely that no permitting or authorization is necessary. The activity is expected to only have minor local impacts to air quality during construction and would not be expected to violate standards. Advise the client to contact the appropriate air quality regulatory agency for verification.	☐
●Clean Water Act / Waters of the U.S. *Guide Sheet* Permitted actions may involve or likely result in the discharge or placement of dredged or fill material in or other pollutants into waters of the US. Ephemeral, intermittent, and perennial streams and certain wetlands will be considered as waters of the US. Mitigation for unavoidable impacts should be expected under Sec. 404 of the Clean Water Act.	May Affect Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation for stream impacts may also be required.	☐	No Effect Land treatment practices are not likely to negatively effect Waters of the US.	☐	May Affect Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins.	☐

●Coastal Zone Management *Guide Sheet* There are no costal zones present in or near the watershed.	No Effect	☐	No Effect	☐	No Effect	☐
Coral Reefs *Guide Sheet* There are no coral reefs present in or near the watershed.	No Effect	☐	No Effect	☐	No Effect	☐
●Cultural Resources / Historic Properties *Guide Sheet* There are known cultural, archeological, and historically significant resources throughout the watershed. Consultation with Tribal Nations, West Virginia State Historic Preservation Officer, and other interested parties with vested interests in a yet to be determined area of potential effect will be conducted according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐
●Endangered and Threatened Species *Guide Sheet* There is a total of 15 Federally listed threatened, endangered, or candidate species potentially found in this watershed listed by the US Fish and Wildlife Service (USFWS). According to West Virginia Department of Natural Resources (WVDNR), WV is a permanent home to 22 federally endangered species (17 animals, 4 plants) and 7 federally threatened species (5 animals, 2 plants). WVDNR's State Wildlife Action Plan (SWAP) recognizes 22 Conservation Focus Areas (CFA) throughout the state that includes Species of Greatest Conservation Need (SGCN). See Appendix E for a complete USFWS IPaC Species list, WVDNR state listings, map of WV CFAs, and a list of SGCN for this watershed.	May Affect This alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Federal, state, and local wildlife agencies will be consulted prior to construction.	☐	May Affect This alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Conservation practices will be evaluated on a plan by plan basis through the Interagency Coordinator Tool and all required avoidance strategies will be followed.	☐	May Affect This alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Federal, state, and local wildlife agencies will be consulted prior to construction.	☐

Environmental Justice *Guide Sheet* Greenbrier County is designated as 'at risk' by the Appalachian Regional Commission, indicating that local economy is not strong. Fayette and Nicholas Counties are designated 'distressed' indicating the local economies are challenged. All counties in the Meadow River watershed are predominately white, with 95% or more of the residents in this classification. The poverty rate is 17.8% for Greenbrier, 21% for Fayette, and 19% for Nicholas, which are high compared to the state and national statistics.	May Affect No negative impacts are anticipated. The project would benefit historically underserved residents, landowners, and communities.	☐	May Affect No negative impacts are anticipated. The project would benefit historically underserved residents, landowners, and communities.	☐		☐
●Essential Fish Habitat *Guide Sheet* This area is not designated as Essential Fish Habitat.	No Effect	☐	No Effect	☐	No Effect	☐
Floodplain Management *Guide Sheet* There is a major risk of flooding within the watershed over the next few decades.	May Affect Floodplain management would be a consideration during the design process of natural stream restoration and would likely be benefited.	☐	No Effect Land treatment practices are not likely to negatively effect flood plains. Annual flooding would likely be reduced to the decreased sedimentation of the stream.	☐	No Effect Annual flooding would likely be reduced to the decreased sedimentation of the stream and increase water holding capacities in wetlands and rain gardens.	☐
Invasive Species *Guide Sheet* Invasive species are found in the watershed.	May Affect Invasive species occur within the watershed. Care would be taken not to introduce invasive species in disturbed areas.	☐	May Affect Invasive species occur within the watershed and would be controlled through scheduled land treatment activates on privately owned or operated lands.	☐	May Affect Invasive species occur within the watershed. Care would be taken not to introduce invasive species in disturbed areas.	☐
●Migratory Birds/Bald and Golden Eagle Protection Act *Guide Sheet* Migratory birds and eagles utilize the Meadow River Watershed habitats. There is a total of 15 federally listed birds in the area. The birds listed are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the project location.	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐

Natural Areas *Guide Sheet* Federal: A portion of the Gauley River National Recreation Area is located in the northwest corner of the watershed and is managed by the National Park Service. The New River Gorge National Park, also managed by NPS, is located just outside of the watershed boundary to the southwest. State: The Meadow River Wildlife Management Area lies within the watershed near Rupert in Greenbrier County. Occupying 2,385 acres of river bottomland, the WMA is located along the Meadow River and consists mainly of wetlands habitat. Babcock State Park, Carnifex Ferry Battlefield State Park, Bruery Mountain WMA, and Summersville Lake WMA are located just outside of the watershed boundary. All are managed by the West Virginia Division of Natural Resources.	No Effect	☐	No Effect	☐	No Effect	☐
Prime and Unique Farmlands *Guide Sheet* Presently there are 8,756 acres of Prime Farmland, which accounts for 4% of land in the study area. Additionally, there are 32,043 acres of Farmland of Local Importance and 29,616 acres of Farmland of Statewide Importance. Farmland protection boards are actively conserving land in the watershed. The threat of conversion in the entire watershed, however, is not drastic.	No Effect Conversion of prime and unique farmlands is not anticipated with this alternative.	☐	No Effect Conversion of prime and unique farmlands is not anticipated with this alternative.	☐	No Effect Conservation of prime and unique farmlands is not anticipated with this alternative.	☐
Riparian Area *Guide Sheet* There are riparian areas present in or near the project area. Riparian areas found in this region are generally characterized as vegetated and un-vegetated. These areas are often utilized for agricultural purposes.	May Affect Riparian areas will be enhanced as part of this alternative.	☐	May Affect Riparian areas will be enhanced as part of this alternative.	☐	May Affect Riparian areas will be enhanced as part of this alternative.	☐
Scenic Beauty *Guide Sheet* Areas of potential scenic beauty in this watershed are typical of the Allegheny Mountain physiographic province and common to the region.	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐

●Wetlands *Guide Sheet* There are 11,206 acres of wetlands within the Meadow River Watershed which consist of the following: 2,274 acres of Freshwater Emergent Wetlands; 4,659 acres of Freshwater Forested/Shrub Wetlands; 597 acres of Freshwater Pond; 29 acres of Lake; 838 acres of other; and 2,809 acres of Riverine.	No Effect Action is not likely to negatively impact any wetlands in the watershed.	☐	No Effect Action is not likely to negatively affect any wetlands in the watershed.	☐	May Affect Action is likely to have a positive impact on wetlands.	☐
●Wild and Scenic Rivers *Guide Sheet* All trout streams are designated as "Waters of Special Concern in Fayette, Greenbrier, and Nicholas counties. The Meadow River from near the US19 bridge to its junction with the Gauley River is designated as a WV Critical Resource Water.	No Effect	☐	No Effect	☐	No Effect	☐

K. Other Agencies and Broad Public Concerns	***Alternative 3***	***Alternative 4***	***Alternative 5***
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.	Implementation of natural stream restoration structures must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins.	No easements or permits are likely to be needed. Installation of all land treatment practices will comply with all applicable local, state, and federal laws. Any required permits will be obtained prior to construction.	Implementation of all infrastructure must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins.
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)	Natural stream restoration would benefit the overall health of the stream and provide additional outdoor recreational opportunities. When applied through out the watershed, the cumulative effects would reduce the impacts of flooding.	Income stability for landowners and farmers in the area, water quality improvements, and improvements to overall environmental health when practices are applied within the same region on many farms. The implementation would cumulatively reduce the impacts of flooding.	Green Infrastructure would benefit the over health of the stream and reduce impacts of flash flooding.
L. Mitigation (Record actions to avoid, minimize, and compensate)	None	None	None
M. Preferred Alternative √ preferred alternative	☐	☐	☐
Supporting reason	Natural stream restoration would benefit the overall heath of the stream.	Implementation of conservation practices to prevent upland erosion causing sediment loading of the water ways.	Reduced impacts of flash flooding and improvement of stream health.
N. Context (Record context of alternatives analysis)	local	local	local

The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.

U.S. Department of Agriculture | NRCS-CPA-52
Natural Resources Conservation Service | 11/2019

ENVIRONMENTAL EVALUATION WORKSHEET

A. Client Name: Town of Rainelle, WV

B. Conservation Plan ID # (as applicable): Meadow River PIFR
Program Authority (optional): PL-566

C. Identification # (farm, tract, field #, etc. as required):
Meadow River Watershed,
Greenbrier, Fayette, Nicholas, and Summers County, WV
10-digit HUC (0505000506)

D. Client's Objective(s) (purpose):
The purpose of this project is to provide watershed protection and agricultural water management by reducing flood water damages, erosion and sedimentation loading in the Meadow River Watershed.

E. Need for Action:
The baseline condition without federal investment is a of flood protection, incidental recreation, rural water supply , and other amenities associated with impoundments. Flooding is persistent and results in loss of property and crops, stream bank erosion, and sedimentation of streams.

H. Alternatives

Alternative 6 √ if RMS ☐	√ if RMS ☐	√ if RMS ☐
Combination of all alternatives- Land Treatment, Stream Restoration, Channelization, Green Infrastructure, and New Structures. Strategic installation of a combination of all practices and structures evaluated in other alternatives could more fully address concerns associated with flooding, erosion and sedimentation, water quality, recreation, and water supply. Technical and financial assistance would be focused in the area through the Watershed Protection and Flood Prevention Act as well as traditional Farm Bill programs such as CTA, EQIP and NWQI, along with funding and in kind services provided by local sponsors		

Resource Concerns

In Section "F" below, analyze, record, and address concerns identified through the Resources Inventory process. (See FOTG Section III - Resource Planning Criteria for guidance).

I. Effects of Alternatives

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	***Alternative 6*** **Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC	**Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC	**Amount, Status, Description** *(Document both short and long term impacts)*	√ if does NOT meet PC
SOIL						
Sheet and rill erosion Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further exasperating flood damages.	Strategic installation of flood control structures, land treatment practices, natural stream restoration and green infrastructure would reduce soil erosion across all land uses and reduce sediment loads in waterways.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
WATER						
Ponding and flooding Flooding has been a historical issue in the watershed with the expected risk of flooding increasing over the next few decades as storms become more frequent and severe, and as the infrastructure ages. Flooding is a threat to property, access to utilities, emergency services, transportation, agricultural land, and crops.	Strategic installation of flood control structures, land treatment practices, natural stream restoration and green infrastructure would reduce sedimentation of streams to allow more capacity during flood events and allow for more water retention and controlled flow from flood control dams and rain gardens/wetlands.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC

Sediment transported to surface water Sedimentation caused by erosion in the uplands of the watershed negatively impact Meadow River and its tributaries. Sediment loading contributes to reduced channel capacity, further exasperating flood damages. Floodplain scour of adjacent floodplains also increase the sediment load of floodwaters during flood events.	Strategic installation of flood control structures, land treatment practices, natural stream restoration and green infrastructure would reduce sediment loads in waterways.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
Nutrients transported to surface water Water quality is negatively affected by nutrients, failing septic systems, and runoff from rural landscapes within the watershed. Many streams within the watershed have elevated levels of fecal coliform from pasture/cropland, failing septic systems, and residential stormwater sources.	Strategic installation of flood control structures, land treatment practices, natural stream restoration and green infrastructure nutrient transportation to waterways and the watershed	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC

F. Resource Concerns and Existing/ Benchmark Conditions (Analyze and record the existing/benchmark conditions for each identified concern)	**I. (continued)**					
	Alternative 6					
	Amount, Status, Description *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**	**Amount, Status, Description** *(Document both short and long term impacts)*	**√ if does NOT meet PC**
AIR						
No resource concern identified Air quality is not currently a resource concern in the watershed.	Air quality may be slightly adversely impacted locally during construction activities (dust and exhaust from construction equipment). The increases are expected to remain well within the air quality standards and would be temporary.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
PLANTS						
Plant structure and composition The watershed provides for both agricultural crops as well as naturally vegetated areas that provide wildlife habitat. There is a lack of plant species diversity, specifically along streams in riparian areas, and a presence of invasive species.	Plant structure and composition would be improved on cropland and pasture land, riparian areas would be restored to natural, native vegetation, hydrophytic vegetation would benefit from wetland restoration and green infrastructure.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ANIMALS						
Terrestrial habitat for wildlife and invertebrates Game and non-game species of wildlife are found within the watershed, however habitat is not ideal. There are 15 threatened, endangered, or candidate species found in the watershed.	Terrestrial habitat would be improved through the implementation of wildlife oriented land treatment practices, riparian areas created as part of natural stream restoration and green infrastructure, and creation/enhancement of wetlands. Displacement of wildlife and destruction of habitat due to flooding would be significantly reduced.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC

Aquatic habitat for fish and other organisms Sedimentation and nutrients are negatively effecting aquatic fish and invertebrate species habitat.	The effects of sedimentation on aquatic wildlife would be significantly controlled with a strategic implementation of all alternatives previously evaluated.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
ENERGY						
No resource concern identified This area has various electrical, oil, and gas transmission facilities. Coal mines, both surface and deep mines, are present within the watershed.	Hydroelectric power generation could be included as an element in the design of the structures to provide clean energy to the region.	☐ NOT meet PC		☐ NOT meet PC		☐ NOT meet PC
Human Economic and Social Considerations						
Public Health and Safety Damaging floods occur on an annual basis with increasing severity over the past few decades. Flooding impacts residents' access to emergency services, results in loss of land, and creates unsanitary conditions in effected residences and businesses.	Strategic planning and installation of all previously evaluated alternatives would increase flood protection of the counties' residences and business. It would also provide the opportunity for rural water supply, recreation opportunities, and a short term creation of jobs during construction. Over all watershed and stream health would be improved.					

Special Environmental Concerns: Environmental Laws, Executive Orders, policies, etc.

In Section "G" complete and attach Environmental Procedures Guide Sheets for documentation as applicable. Items with a "●" may require a federal permit or consultation/coordination between the lead agency and another government agency. In these cases, effects may need to be determined in consultation with another agency. Planning and practice implementation may proceed for practices not involved in consultation.

G. Special Environmental Concerns (Document existing/ benchmark conditions)	**J. Impacts to Special Environmental Concerns**					
	Alternative 6					
	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action	Document all impacts (Attach Guide Sheets as applicable)	√ if needs further action
●Clean Air Act *Guide Sheet* The watershed is not in an area recognized for regularly having impaired air quality or significant air quality issues.	May Affect It is likely that no permitting or authorization is necessary. The activity is expected to only have minor local impacts to air quality during construction and would not be expected to violate standards. Advise the client to contact the appropriate air quality regulatory agency for verification.	☐		☐		☐
●Clean Water Act / Waters of the U.S. *Guide Sheet* Permitted actions may involve or likely result in the discharge or placement of dredged or fill material in or other pollutants into waters of the US. Ephemeral, intermittent, and perennial streams and certain wetlands will be considered as waters of the US. Mitigation for unavoidable impacts should be expected under Sec. 404 of the Clean Water Act.	May Affect Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation for stream impacts may also be required.	☐		☐		☐

●Coastal Zone Management *Guide Sheet* There are no costal zones present in or near the watershed.	No Effect	☐		☐		☐
Coral Reefs *Guide Sheet* There are no coral reefs present in or near the watershed.	No Effect	☐		☐		☐
●Cultural Resources / Historic Properties *Guide Sheet* There are known cultural, archeological, and historically significant resources throughout the watershed. Consultation with Tribal Nations, West Virginia State Historic Preservation Officer, and other interested parties with vested interests in a yet to be determined area of potential effect will be conducted according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	May Affect Consultation with Tribal Nations, West Virginia State Historic Preservation Office (SHPO), and other interested parties will be conducted in according to Section 106 of the National Historical Preservation Act (NHPA) of 1966, as amended.	☐		☐		☐
●Endangered and Threatened Species *Guide Sheet* There is a total of 15 Federally listed threatened, endangered, or candidate species potentially found in this watershed listed by the US Fish and Wildlife Service (USFWS). According to West Virginia Department of Natural Resources (WVDNR), WV is a permanent home to 22 federally endangered species (17 animals, 4 plants) and 7 federally threatened species (5 animals, 2 plants). WVDNR's State Wildlife Action Plan (SWAP) recognizes 22 Conservation Focus Areas (CFA) throughout the state that includes Species of Greatest Conservation Need (SGCN). See Appendix E for a complete USFWS IPaC Species list, WVDNR state listings, map of WV CFAs, and a list of SGCN for this watershed.	May Affect The structural alternative is not expected to create an adverse impact to threatened, endangered, or rare species. Federal, state, and local wildlife agencies will be consulted prior to construction.	☐		☐		☐

Environmental Justice *Guide Sheet* Greenbrier County is designated as 'at risk' by the Appalachian Regional Commission, indicating that local economy is not strong. Fayette and Nicholas Counties are designated 'distressed' indicating the local economies are challenged. All counties in the Meadow River watershed are predominately white, with 95% or more of the residents in this classification. The poverty rate is 17.8% for Greenbrier, 21% for Fayette, and 19% for Nicholas, which are high compared to the state and national statistics.	No Effect No negative impacts are anticipated. The project would benefit historically underserved residents, landowners, and communities.	☐		☐		☐
●Essential Fish Habitat *Guide Sheet* This area is not designated as Essential Fish Habitat.	No Effect	☐		☐		☐
Floodplain Management *Guide Sheet* There is a major risk of flooding within the watershed over the next few decades.	May Affect This alternative will result in the protection of floodplains due to the decreased impacts of flooding.	☐		☐		☐
Invasive Species *Guide Sheet* Invasive species are found in the watershed.	May Affect Invasive species occur within the watershed. Care would be taken not to introduce invasive species in disturbed areas.	☐		☐		☐
●Migratory Birds/Bald and Golden Eagle Protection Act *Guide Sheet* Migratory birds and eagles utilize the Meadow River Watershed habitats. There is a total of 15 federally listed birds in the area. The birds listed are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the project location.	No Effect Actions will not result in intentional or unintentional take of any migratory bird, nest, or egg.	☐		☐		☐

Natural Areas *Guide Sheet* Federal: A portion of the Gauley River National Recreation Area is located in the northwest corner of the watershed and is managed by the National Park Service. The New River Gorge National Park, also managed by NPS, is located just outside of the watershed boundary to the southwest. State: The Meadow River Wildlife Management Area lies within the watershed near Rupert in Greenbrier County. Occupying 2,385 acres of river bottomland, the WMA is located along the Meadow River and consists mainly of wetlands habitat. Babcock State Park, Carnifex Ferry Battlefield State Park, Bruery Mountain WMA, and Summersville Lake WMA are located just outside of the watershed boundary. All are managed by the West Virginia Division of Natural Resources.	No Effect	☐		☐		☐
Prime and Unique Farmlands *Guide Sheet* Presently there are 8,756 acres of Prime Farmland, which accounts for 4% of land in the study area. Additionally, there are 32,043 acres of Farmland of Local Importance and 29,616 acres of Farmland of Statewide Importance. Farmland protection boards are actively conserving land in the watershed. The threat of conversion in the entire watershed, however, is not drastic.	No Effect Alternative would provide protection of prime farmland through the reduction of streambank erosion, sheet and rill erosion, and sedimentation of streams.	☐		☐		☐
Riparian Area *Guide Sheet* There are riparian areas present in or near the project area. Riparian areas found in this region are generally characterized as vegetated and un-vegetated. These areas are often utilized for agricultural purposes.	May Affect Riparian areas would be enhanced through the installation of natural stream restoration, land treatment programs, and green infrastructure.	☐		☐		☐
Scenic Beauty *Guide Sheet* Areas of potential scenic beauty in this watershed are typical of the Allegheny Mountain physiographic province and common to the region.	No Effect Action is not likely to negatively affect the scenic beauty of the area or alter the unique landscapes of the Allegheny Mountain physiographic province.	☐		☐		☐

●Wetlands *Guide Sheet* There are 11,206 acres of wetlands within the Meadow River Watershed which consist of the following: 2,274 acres of Freshwater Emergent Wetlands; 4,659 acres of Freshwater Forested/Shrub Wetlands; 597 acres of Freshwater Pond; 29 acres of Lake; 838 acres of other; and 2,809 acres of Riverine.	May Affect Alternative would enhance the values and functions of wetlands and surrounding ecosystems.	☐		☐		☐
●Wild and Scenic Rivers *Guide Sheet* All trout streams are designated as "Waters of Special Concern in Fayette, Greenbrier, and Nicholas counties. The Meadow River from near the US19 bridge to its junction with the Gauley River is designated as a WV Critical Resource Water.	No Effect	☐		☐		☐
K. Other Agencies and Broad Public Concerns	***Alternative 6***					
Easements, Permissions, Public Review, or Permits Required and Agencies Consulted.	Installation of any water control structures will involve the placement of fill material in streams and must comply with all applicable local, state, and federal laws. Compliance will require permits and must be obtained before construction begins. Mitigation may also be required.					
Cumulative Effects Narrative (Describe the cumulative impacts considered, including past, present and known future actions regardless of who performed the actions)	Strategic installation of all previously evaluated alternatives across the watershed will improve the areas overall resilience to flooding and improve quality of life for the ecosystems and the residents.					
L. Mitigation (Record actions to avoid, minimize, and compensate)	Mitigation would likely be required for the length of streams impacted. Vegetation will be established on disturbed areas immediately following construction to a vegetative plan developed conjunction with NRCS and local sponsors.					
M. Preferred Alternative	√ preferred alternative	☐		☐		☐
	Supporting reason	Installation of various flood control and land treatment practices will provide a holistic approach to flood resiliency.				
N. Context (Record context of alternatives analysis)		local				
The significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.						

O. To the best of my knowledge, the data shown on this form is accurate and complete:
In the case where a non-NRCS person (e.g. a TSP) assists with planning they are to sign the first signature block and then NRCS is to sign the second block to verify the information's accuracy.

Signature (TSP if applicable)	Title	Date
JULIE STUTLER Digitally signed by JULIE STUTLER Date: 2022.10.19 19:12:40 -04'00'	Outreach Coordinator Level 3 Certified Planner	10/19/2022
Signature (NRCS)	**Title**	**Date**

If preferred alternative is not a federal action where NRCS has control or responsibility and this NRCS-CPA-52 is shared with someone other than the client then indicate to whom this is being provided.

The following sections are to be completed by the Responsible Federal Official (RFO)

NRCS is the RFO if the action is subject to NRCS control and responsibility (e.g., actions financed, funded, assisted, conducted, regulated, or approved by NRCS). These actions do not include situations in which NRCS is only providing technical assistance because NRCS cannot control what the client ultimately does with that assistance and situations where NRCS is making a technical determination (such as Farm Bill HEL or wetland determinations) not associated with the planning process.

P. Determination of Significance or Extraordinary Circumstances
To answer the questions below, consider the severity (intensity) of impacts in the contexts identified above. Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

If you answer ANY of the below questions "yes" then contact the State Environmental Liaison as there may be extraordinary circumstances and significance issues to consider and a site specific NEPA analysis may be required.

Yes	No	
☐	☒	• Is the preferred alternative expected to cause significant effects on public health or safety?
☒	☐	• Is the preferred alternative expected to significantly affect unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?
☒	☐	• Are the effects of the preferred alternative on the quality of the human environment likely to be highly controversial?
☐	☒	• Does the preferred alternative have highly uncertain effects or involve unique or unknown risks on the human environment?
☐	☒	• Does the preferred alternative establish a precedent for future actions with significant impacts or represent a decision in principle about a future consideration?
☐	☒	• Is the preferred alternative known or reasonably expected to have potentially significant environment impacts to the quality of the human environment either individually or cumulatively over time?
☐	☒	• Will the preferred alternative likely have a significant adverse effect on ANY of the special environmental concerns? Use the Evaluation Procedure Guide Sheets to assist in this determination. This includes, but is not limited to, concerns such as cultural or historical resources, endangered and threatened species, environmental justice, wetlands, floodplains, coastal zones, coral reefs, essential fish habitat, wild and scenic rivers, clean air, riparian areas, natural areas, and invasive species.
☐	☒	• Will the preferred alternative threaten a violation of Federal, State, or local law or requirements for the protection of the environment?

Q. NEPA Compliance Finding (check one)

The preferred alternative:		Action required
☐	1) is **not a federal action** where the agency has control or responsibility.	Document in "R.1" below. No additional analysis is required
☐	2) is a federal action **ALL** of which is **categorically excluded** from further environmental analysis **AND** there are **no extraordinary circumstances as identified in Section "P".**	Document in "R.2" below. No additional analysis is required
☐	3) is a federal action that has been **sufficiently analyzed** in an existing Agency state, regional, or national NEPA document **and** there are no predicted significant adverse environmental effects or extraordinary circumstances.	Document in "R.1" below. No additional analysis is required.
☐	4) is a federal action that has been sufficiently analyzed in another Federal agency's NEPA document (EA or EIS) that addresses the proposed NRCS action and its' effects **and has been formally adopted by NRCS**. NRCS is required to prepare and publish its own Finding of No Significant Impact for an EA or Record of Decision for an EIS when adopting another agency's EA or EIS document. (**Note: This box is not applicable to FSA)**	Contact the State Environmental Liaison for list of NEPA documents formally adopted and available for tiering. Document in "R.1" below. No additional analysis is required
☑	5) is a federal action that has **NOT** been sufficiently analyzed or may involve predicted significant adverse environmental effects or extraordinary circumstances and may require an EA or EIS.	Contact the State Environmental Liaison. Further NEPA analysis required.

R. Rationale Supporting the Finding	
R.1 Findings Documentation	An Environmental Assessment would be prepared for the project if it proceeds to the planning phase. This potential project meets the salutatory acreage, volume/capacity of structure and recreation limit requirements for a PL-566 project. This potential project also meets the requirements of one or more Watershed Operations authorized purposes: Flood Prevention, Watershed Protection, and Agricultural Water Management. It meets the requirement for a minimum of 20% agricultural or rural benefits. It has sponsors who are ready, willing and able to carry out their responsibilities. There are no apparent insurmountable obstacles to this potential project. Section D of this form is not completed because the preferred alternative will not be known until planning is complete.
R.2 Applicable Categorical Exclusion(s) **(more than one may apply)** 7 CFR Part 650 *Compliance With NEPA* , subpart 650.6 *Categorical Exclusions* states prior to determining that a proposed action is categorically excluded under paragraph (d) of this section, the proposed action must meet six sideboard criteria. See NECH 610.116.	

I have considered the effects of the alternatives on the Resource Concerns, Economic and Social Considerations, Special Environmental Concerns, and Extraordinary Circumstances as defined by Agency regulation and policy and based on that made the finding indicated above.

S. Signature of Responsible Federal Official:

JEFFREY BARR Digitally signed by JEFFREY BARR Date: 2024.02.13 14:49:13 -05'00'	Acting State Conservationist	2/13/2024
Signature	**Title**	**Date**

Additional notes

Appendix D.

Forecasted NRCS Staffing Needs

Meadow River Staffing Needs

	Planner	Engineer	Engineer	Biologist	Economist	Admin Asst
Phase 1 -Identify Problems, Opportunities, & Concerns						
Final plan of work	30	16	16	16	16	6
Public Participation plan	20	12	12	12	12	2
Gather Data	50	50	50	50	50	20
Consultation List	6				12	2
Final assessment	18	18	18	18	18	6
Total	**124**	**96**	**96**	**96**	**108**	**36**
Phase 2 -Determine Objectives						
Document Sponsor Objectives	6	6	6	6	6	2
Write purpose & Need statement	10	6	6	6	6	4
Agency consultation/coordination	12	12	12	12	12	4
Tribal consultation	20				20	4
Scoping public meeting	12	10	10	10	10	4
Write scope of plan	10	10	10	10	10	8
Total	**70**	**44**	**44**	**44**	**64**	**26**
Phase 3 -Inventory Resources						
Resource Inventories & watershed assessment						
Economic & Social Assessment						
Collect Population Demographics					15	2
Identify effcts to public health & safety					16	2
Identify effcts to homes, businesses & ag operations					80	6
Identify visual concerns					15	2
Collect economic data					40	4
Identify non-NEPA laws related to project	4	4	4	4	6	2
Identify approved regional water resource plans in project	2	2	2	2	2	2
Final economic and social assessment					60	6
Archaeological & Historic Assessment						
Literature review				240		10
Coordination with State Historic Preservation Officer				80		6
Final archaeologcial and historic assessment				350		10
Geologic Assessment & Engineering Assessment						
Review existing geologic investigations		20	20			
Enigneering Surveys		80	80			
Evaluate condition of existing structures		30	30			
Final geologic assessment and engineering assessment		100	100			
Total	**6**	**236**	**236**	**676**	**234**	**52**

Meadow River Staffing Needs

	Planner	Engineer	Engineer	Biologist	Economist	Admin Asst
Phase 4 -Analyze Resource Data						
Develop resource existing conditions	20	20	20	20	20	6
Economic & Social Assessment						
Quantify onsite/offsite damages					100	6
Economics and social effects (future without project condition)					40	6
Archaeological & Historic Assessment				16		
Geologic Assessment & Engineering Assessment						
Determine geologic investigation needs		40	40			
Review existing hydrology /hydraulic models		40	40			
Determine watershed conditions (CN, Tc, rainfall)		80	80			
Run preliminary hydraulics		40	40			
Develop hydrologic model for watershed		60	60			
Run hydrologic models		60	60			
Total	**20**	**340**	**340**	**36**	**160**	**18**
Phase 5 -Formulate Alternatives						
Analysis of initial alternatives						
Document alternatives eliminated from detailed study	10	12	12	8	8	10
Document reasonable alternatives	10	12	12	10	10	10
Identify permits, licenses, other entitlements required	4	4	4	4	4	2
Define mitigation strategies	8	6	6	10	10	4
Determine project costs for each alternative		22	22			4
Final plan of work	8	4	4	4	4	2
Final initial alternatives report	50	50	50	50	50	10
Total	**90**	**110**	**110**	**86**	**86**	**42**

Meadow River Staffing Needs

Phase 6 -Evaluate Alternatives	**Planner**	**Engineer**	**Engineer**	**Biologist**	**Economist**	**Admin Asst**
Summary & comparison of alternatives	12	12	12	12	12	4
Evaluate environmental resources	30			30		2
Geology		20	20			4
Foundation & slope stability		40	40			8
Sedimentation						
Hydrology & Hydraulics		110	110			20
Run hydrologic models		150	150			20
Breach inundation study		120	120			20
Develop floodplain maps						
Economics						
Determine economic benefits for each alternative					80	10
Trend analysis for alternatives					10	2
Claculate average annual damages					20	2
Calculate benefit cost ratio					6	
Detremine National Economic Efficiency plan					6	
Final summary & comparison of alternative table					180	20
Final environmental consequences narrative	100			100		20
Total	**142**	**452**	**452**	**142**	**314**	**132**

Phase 7 -Make Decisions						
Compare & review alternatives with sponsor	30	10	10	10	10	2
Evaluate environmental resources	440	110	110	110	110	40
Total	**470**	**120**	**120**	**120**	**120**	**42**

Phase 8 -Review & Draft Environmental Document						
Response to agencies and other interseted parties' comments	24	20	20	20	20	4
Repsonse NWMC and SLO review	100	40	40	40	40	10
Repsonse to HQ National Programmatic review	20	10	10	10	10	2
Complete plan	30	30	30	30	30	4
Total	**174**	**100**	**100**	**100**	**100**	**20**

Meadow River Staffing Needs,
assuming NRCS will conduct work with own staff

	Planner	Engineer	Engineer	Bilologist	Economist	Admin Asst	
Total Hours	1096	1498	1498	1300	1186	368	
Hourly Rate (includes overhead)	*$120.00*	*$100.00*	*$100.00*	*$100.00*	*$100.00*	*$75.00*	**TOTAL COST**
Total Cost	**$131,520.00**	**$149,800.00**	**$149,800.00**	**$130,000.00**	**$118,600.00**	**$27,600.00**	**$707,320.00**

Appendix E.

Supporting Information Appendix (T&E and Invasive Species)

Endangered species

Listed species and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

Additional information on endangered species data is provided below.

The following species are potentially affected by activities in this location:

THUMBNAILS | LIST

SPECIES GUIDELINES

Mammals

NAME	STATUS
Gray Bat Myotis grisescens Wherever found	Endangered
Indiana Bat CH Myotis sodalis Wherever found	Endangered
Northern Long-eared Bat Myotis septentrionalis Wherever found	Threatened
Virginia Big-eared Bat CH Corynorhinus (=Plecotus) townsendii virginianus Wherever found	Endangered

Fishes

NAME	STATUS
Candy Darter CH Etheostoma osburni Wherever found	Endangered

Clams

NAME	STATUS
Fanshell Cyprogenia stegaria Wherever found	Endangered
Northern Riffleshell Epioblasma rangiana Wherever found	Endangered
Pink Mucket (pearlymussel) Lampsilis abrupta Wherever found	Endangered
Sheepnose Mussel Plethobasus cyphyus Wherever found	Endangered
Snuffbox Mussel Epioblasma triquetra Wherever found	Endangered
Spectaclecase (mussel) Cumberlandia monodonta Wherever found	Endangered
Tubercled Blossom (pearlymussel) Epioblasma torulosa torulosa	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found	Candidate

Flowering Plants

NAME	STATUS
Small Whorled Pogonia Isotria medeoloides	Threatened
Virginia Spiraea Spiraea virginiana Wherever found	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

RELATED LINKS

Birds of Conservation Concern

Measures for avoiding and minimizing impacts to birds

Nationwide conservation measures for birds

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

THUMBNAILS | LIST

PROBABILITY OF PRESENCE SUMMARY

NAME / LEVEL OF CONCERN	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* Non-BCC Vulnerable	Breeds Sep 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* BCC Rangewide (CON)	Breeds May 15 to Oct 10
Black-capped Chickadee *Poecile atricapillus practicus* BCC - BCR	Breeds Apr 10 to Jul 31
Bobolink *Dolichonyx oryzivorus* BCC Rangewide (CON)	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* BCC Rangewide (CON)	Breeds May 20 to Aug 10

Cerulean Warbler Dendroica cerulea BCC Rangewide (CON)	Breeds Apr 27 to Jul 20
Chimney Swift Chaetura pelagica BCC Rangewide (CON)	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will Antrostomus vociferus BCC Rangewide (CON)	Breeds May 1 to Aug 20
Golden-winged Warbler Vermivora chrysoptera BCC Rangewide (CON)	Breeds May 1 to Jul 20
Kentucky Warbler Oporornis formosus BCC Rangewide (CON)	Breeds Apr 20 to Aug 20
Prairie Warbler Dendroica discolor BCC Rangewide (CON)	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea BCC Rangewide (CON)	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus BCC Rangewide (CON)	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus BCC - BCR	Breeds elsewhere
Wood Thrush Hylocichla mustelina BCC Rangewide (CON)	Breeds May 10 to Aug 31

Listing status

The Endangered Species Act (ESA) and the guidance and policies of the U.S. Fish and Wildlife Service (Service) define many categories of listing statuses for species. As a general rule, IPaC uses the term "listed species" to generically refer to species that may belong to any of the categories.

Endangered (E)

Any species which is in danger of extinction throughout all or a significant portion of its range. Endangered species are protected by the take prohibitions of section 9 under the ESA.

Threatened (T)

Any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Threatened species are protected by the take prohibitions of section 9, consistent with any protective regulations finalized under section 4(d) of the ESA.

Candidate (C)

Any species for which the Service has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species are not protected by the take prohibitions of section 9 of the ESA.

Proposed endangered (PE)

Any species the Service has determined is in danger of extinction throughout all or a significant portion of its range and the Service has proposed a draft rule to list as endangered. Proposed endangered species are not protected by the take prohibitions of section 9 of the ESA until the rule to list is finalized. Under section 7(a)(4) of the ESA, federal agencies must confer with the Service if their action will jeopardize the continued existence of a proposed species.

Proposed threatened (PT)

Any species the Service has determined is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and the Service has proposed a draft rule to list as threatened. Proposed threatened species are not protected by the take prohibitions of section 9, consistent with any protective regulations finalized under section 4(d) of the ESA, until the rule to list is finalized. Under section 7(a)(4) of the ESA, federal agencies must confer with the Service if their action will jeopardize the continued existence of a proposed species.

Similarity of Appearance, Endangered (SAE)

Any species listed as endangered due to similarity of appearance with another species that is listed as endangered. Species listed under a similarity of appearance are not biologically endangered and are not subject to section 7 consultation. Listing by similarity of appearance depends on the degree of difficulty law enforcement personnel would have in distinguishing the species from an endangered species and where the additional threat posed to the endangered species by the similarity of appearance. Species listed under a similarity of appearance may be protected by the take prohibitions of section 9 under the ESA, where they overlap with the listed entity they were listed to protect.

Similarity of Appearance, Threatened (SAT)

Any species listed as threatened due to similarity of appearance with another species that is listed as threatened. Species listed under a similarity of appearance are not biologically endangered and are not subject to section 7 consultation. Listing by similarity of appearance depends on the degree of difficulty law enforcement personnel would have in distinguishing the species from a threatened species and where the additional threat posed to the threatened species by the similarity of appearance. Species listed under a similarity of appearance may be protected by the take prohibitions of section 9 under the ESA, where they overlap with the listed entity they were listed to protect.

Proposed Similarity of Appearance, Endangered (PSAE)

Any species proposed for listing as endangered due to similarity of appearance with another species that is listed as endangered, but a final rule to list has not yet been published. Species proposed for listing under a similarity of appearance are not biologically endangered and are not subject to section 7 consultation. Listing by similarity of appearance depends on the degree of difficulty law enforcement personnel would have in distinguishing the species from an endangered species and where the additional threat posed to the endangered species by the similarity of appearance. Proposed similarity of appearance are not protected by the take prohibitions of section 9 of the ESA until the rule is finalized.

Proposed Similarity of Appearance, Threatened (PSAT)

Any species proposed for listing as threatened due to similarity of appearance with another species that is listed as threatened, but a final rule to list has not yet been published. Species proposed for listing under a similarity of appearance are not biologically threatened and are not subject to section 7 consultation. Listing by similarity of appearance depends on the degree of difficulty law enforcement personnel would have in distinguishing the species from a threatened species and where the additional threat posed to the threatened species by the similarity of appearance. Proposed threatened species are not protected by the take prohibitions of section 9 of the ESA until the rule is finalized.

Emergency listing, Endangered (EmE)

Any species for which the Secretary of the Department of the Interior (Secretary) has determined it is at significant immediate risk of survival and publishes an emergency listing as endangered. The emergency listing is temporary (240 days). During this time the Service evaluates the species under standard listing protocols. Emergency-listed endangered species are afforded all the protections afforded by the ESA.

Emergency listing, Threatened (EmT)

Any species for which the Secretary has determined it is at significant immediate risk of survival and publishes an emergency listing as threatened. The emergency listing is temporary (240 days). During this time the Service evaluates the species under standard listing protocols. Emergency-listed threatened species are protected by the take prohibitions of section 9, consistent with any protective regulations finalized under section 4(d) of the ESA.

Experimental population, Essential (EXPE)

A population that has been established within its historical range under section 10(j) of the ESA to aid recovery of the species. The Service has determined an essential population is necessary for the continued existence of the species. Essential experimental populations are treated as threatened species and afforded all the protections afforded to threatened species by the ESA.

Experimental population, Non-essential (EXPN)

A population that has been established within its historical range under section 10(j) of the ESA to aid recovery of the species. The Service has determined a non-essential population is not necessary for the continued existence of the species. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements, but Federal agencies must not jeopardize their existence (section 7(a)(4))).

Proposed experimental population, Essential (PEXPE)

A population that has been proposed for establishment within its historical range under section 10(j) of the ESA to aid recovery of the species. The Service has proposed an essential population is necessary for the continued existence of the species. Proposed essential experimental populations will be treated as threatened species and afforded all the protections afforded to threatened species by the ESA when finalized. Prior to a final designation under section 10(j) of the ESA, proposed experimental populations do not require consultation under section 7(a)(2) of the ESA and are not protected by the take prohibitions of section 9. Federal agencies must confer with the Service for any actions that may jeopardize the continued existence of proposed species.

Proposed experimental population, Non-essential (PEXPN)

A population that has been proposed for establishment within its historical range under section 10(j) of the ESA to aid recovery of the species. The Service has determined a non-essential population is not necessary for the continued existence of the species. Once finalized, for the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements, but Federal agencies must not jeopardize their existence (section 7(a)(4))). Federal agencies must confer with the Service for any actions that may jeopardize the continued existence of proposed species.

Birds of Conservation Concern (BBC)

Bird Conservation Region (BBR)

Continental United States and Alaska (CON)

USFWS Information for Planning and Consultation tool (IPac)

(https://ipac.ecosphere.fws.gov/location and upload shapefile of watershed)

(https://ipac.ecosphere.fws.gov/status/list)

Federally Threatened and Endangered Species in West Virginia

Federally Endangered Species		Critical Habitat	Year Listed
Indiana bat	*Myotis sodalis*	Y	1967
gray bat (accidental)	*Myotis grisescens*		1976
Pink mucket pearlymussel	*Lampsilis abrupta*		1976
Virginia big-eared bat	*Corynorhinus townsendii virginianus*	Y	1979
running buffalo clover *	*Trifolium stoloniferum*		1987
harperella	*Ptilimnium nodosum*		1988
shale barren rockcress	*Arabis serotina*		1989
fanshell	*Cyprogenia stegaria*		1990
purple cat's paw pearlymussel	*Epioblasma obliquata obliquata*		1990
northeastern bulrush *	*Scirpus ancistrochaetus*		1991
northern rifffleshell	*Epioblasma torulosa rangiana*		1993
clubshell	*Pleurobema clava*		1993
James spinymussel	*Pleurobema collina*		1998
snuffbox	*Epioblasma triquetra*		2012
rayed bean	*Villosa fabalis*		2012
spectaclecase	*Cumberlandia monodonta*		2012
sheepnose	*Plethobasus cyphyus*		2012
Diamond Darter	*Crystallaria cincotta*	Y	2013
Guyandotte River crayfish	*Cambarus veteranus*	proposed	2016
rusty patched bumble bee	*Bombus affinis*		2017
Candy Darter	*Etheostoma osburni*	proposed	2018
tubercled-blossom pearly mussel	*Epioblasma torulosa torulosa*	extirpated	

Federally Threatened Species		Critical Habitat	4(d) rule	Year Listed
flat-spired three-toothed land snail	*Triodopsis platysayoides*			1978
Madison Cave isopod	*Antrolana lira*	Y		1982
small whorled pogonia	*Isotria medeoloides*			1982
Cheat Mountain salamander	*Plethodon nettingi*			1989
Virginia spiraea	*Spiraea virginiana*			1990
northern long-eared bat	*Myotis septentrionalis*		Y	2015
Big Sandy crayfish	*Cambarus callainus*	proposed		2016
eastern black rail (accidental)	*Laterallus jamaicensis jamaicensis*		Y	2020

Species Propopsed for Listing		Critical Habitat	Status	Year Listed
round hickorynut	*Obovaria subrotunda*	Y	Thr.	2020
longsolid	*Fusconaia subrotunda*	Y	Thr.	2020

* Proposed for delisting

Revised: 30 September 2020

Invasive species examples:

- **Garlic mustard, Japanese honeysuckle** and **kudzu**- invaders of moist forest edges, even those without disturbance.
- **Purple loosestrife-** an incredibly invasive exotic now blanketing emergent wetlands along the Ohio River, and increasing along other major rivers throughout the state. In some cases it replaces native vegetation, threatens rare plant species, and destroys small wetlands.
- **Mile-a-minute**- a spiny vine found climbing 10-20 feet into trees, often smothering native shrubs and shading out herbaceous plants along the Ohio River and rivers in the Eastern Panhandle.

Garlic mustard

Spotted knapweed

- **Japanese knotweed and sachaline knotweed**- two stout, perennial clonal herbs that can out-compete all other vegetation in certain areas.
- **Spotted knapweed, barren brome and tree of heaven-** invaders of shale barrens, limestone glades and barrens, and native grassland communities.

What can you do?

- Become aware of the differences between native and non-native plants and the potential for invasive species to damage native ecosystems. The following items are available from the WVDNR:
  - ❖*Checklist of the Vascular Flora of West Virginia*, a checklist of the native and naturalized vascular plants of the state.
  - ❖*Native Shrubs in Wildlife Landscaping*, a series of information sheets about the use of 50 native shrubs in wildlife planting, produced by the West Virginia Native Plant Society and the West Virginia Wildlife Diversity program.
  - ❖A list of companies within the mid-Atlantic region from which alternative native stock can be purchased.
- Evaluate in advance the wisdom of introducing non-native plants into our state.
- Minimize habitat disturbance in natural areas, reducing the chance for invasion by non-native aggressive plants.
- In extreme cases, consider the eradication of highly problematic non-native invasive plant species, but carefully consider the potential consequences on the entire ecosystem and the likelihood of success. In less severe cases, try to minimize the impact of the invasive plant on the natural area.
- Help educate individuals of the seriousness of the problem and explore the use of native plant species in the management of public lands.
- If you find an unfamiliar plant and it appears to be spreading, have it identified by your local extension agent. If it is a potential invader, members of the WV Invasive Species Working Group will conduct an assessment and make recommendations.

Who is helping?

- The ***West Virginia Invasive Species Working Group***, an inclusive statewide group whose mission is to facilitate communication and collaboration for the prevention or reduction of the negative impacts of invasive species.
- The ***West Virginia Native Plant Society*** encourages nurserymen to cultivate plants native to West Virginia that could be used in conservation and ornamental projects throughout the state as alternatives to non-native invasive plant species.
- The ***West Virginia Garden Club, Inc.,*** the West Virginia Native Plant Society and the WV Division of Natural Resources jointly produced this brochure.
- The ***West Virginia Native Plant Society*** and the ***West Virginia Natural Heritage Program*** have developed informative presentations about invasive plants. Please contact the DNR Elkins office *(below)* to arrange a presentation.
- Several organizations sponsor workshops on identifying problematic plant species.

West Virginia Division of Natural Resources
in cooperation with:
West Virginia Garden Clubs, Inc.
West Virginia Native Plant Society

Cover photos: Background image of Japanese knotweed by Jil M. Swearingen, USDI National Park Service, www.forestryimages.org and Purple loosestrife (inset) by Linda Haugen, USDA Forest Service, www.forestryimages.org

Wildlife Diversity Program

Wildlife Resources
West Virginia Division of Natural Resources

P.O. Box 67
Elkins, WV 26241
(304) 637-0245
Fax: (304) 637-0250

10M 4/06

WVDNR WILDLIFE RESOURCES SECTION

Invasive Plants of West Virginia

www.wvdnr.gov

Kudzu

What are non-native invasive plants?

People have been moving Earth's plants from place to place for centuries. Many of the exotic plants we have introduced to our landscape by intention or accident have been beneficial to us and have had no unfortunate ecological impacts on natural communities. But a small percentage have spread from where they first became established, and have become serious threats to wetlands, shale barrens, prairies, glades and other rare ecosystems.

Invasive plants often get started in areas disturbed by such human activities as road and trail building, timbering, mining, and other activities that remove native vegetation, disturb the soil, or dramatically change the amount of sunlight or moisture that reaches the land. From such situations, a relatively small number of invasive species have moved into natural areas. These species have reproduced rapidly, forming stands that exclude nearly all other plant species. In the worst cases, they radically altered ecosystem processes and natural areas, and displaced native species.

Concerned citizens have long been sounding alarms about the effects of pollution and misuse of land on our native plant and animal communities. Recently, increasing concern has been expressed that non-native plant species are invading and changing natural areas. These aggressive "weeds" are non-native invasive plants, sometimes referred to as exotic pest plants.

We value Natural Areas!

Natural areas are generally areas of limited development where naturally occurring, functioning ecosystems are supporting the greatest amount of natural biological diversity the nonliving resources (soil, sunlight, minerals, etc.) of that area can support.

- Healthy natural areas have seemingly endless interrelationships among the living and non-living parts of their ecosystems. Life thrives in such areas!
- Natural areas often support rare, threatened and endangered species of plants, animals, and fungi. The natural communities themselves are often rare enough or of such quality that society recognizes the value of conserving them.

Loosestrife infestation.

- Natural areas are valuable parts of the global landscape from which future generations can continue to learn about ecological processes. Areas such as Cranberry Glades, Cranesville Swamp, shale barrens, limestone glades and riverine marches are a few West Virginia examples.

Non-native invasive plant species, in numerous examples around the world, have reduced available habitat for native species and/or eliminated associated native species altogether. This process has the potential to significantly reduce natural biological diversity.

How do they differ from native species?

Generally, the native plant species of West Virginia are those that were part of plant communities when North America was first settled by Europeans. Change in plant communities is a natural part of life. As Dr. John Randall (The Nature Conservancy) and Janet Marinelli (Brooklyn Botanic Garden), point out in their handbook, *Invasive Plants: Weeds of the Global Garden*:

"New species move in as the climate changes and as soils build up and become richer, or erode and become less fertile.

In the normal course of events, the arrival of new species may be the result of a single catastrophic event like a hurricane, or of gradual change over thousands of years. Humans have vastly accelerated the movement of plants, carrying thousands of species that could not have crossed natural barriers like oceans, mountain ranges and deserts, to new areas.

Mile-a-minute

Species that have flourished and spread on their own, only after people transported them across barriers they could not otherwise surmount, are considered non-natives. In many areas these plants have overwhelmed the native plants and animals."

Stilt grass overtaking an interior mud-flat wetland at Ohio River Island.

What challenges are there in controlling invasive plants?

The number of non-native invasive plant species in West Virginia is rising

Approximately 600 species, nearly 25% of vascular plants found in West Virginia outside of cultivation, are non-native. Each year, ecologists become more aware of the number of invasive plant species within the state and the threats they pose to natural communities.

Native stock plants are available

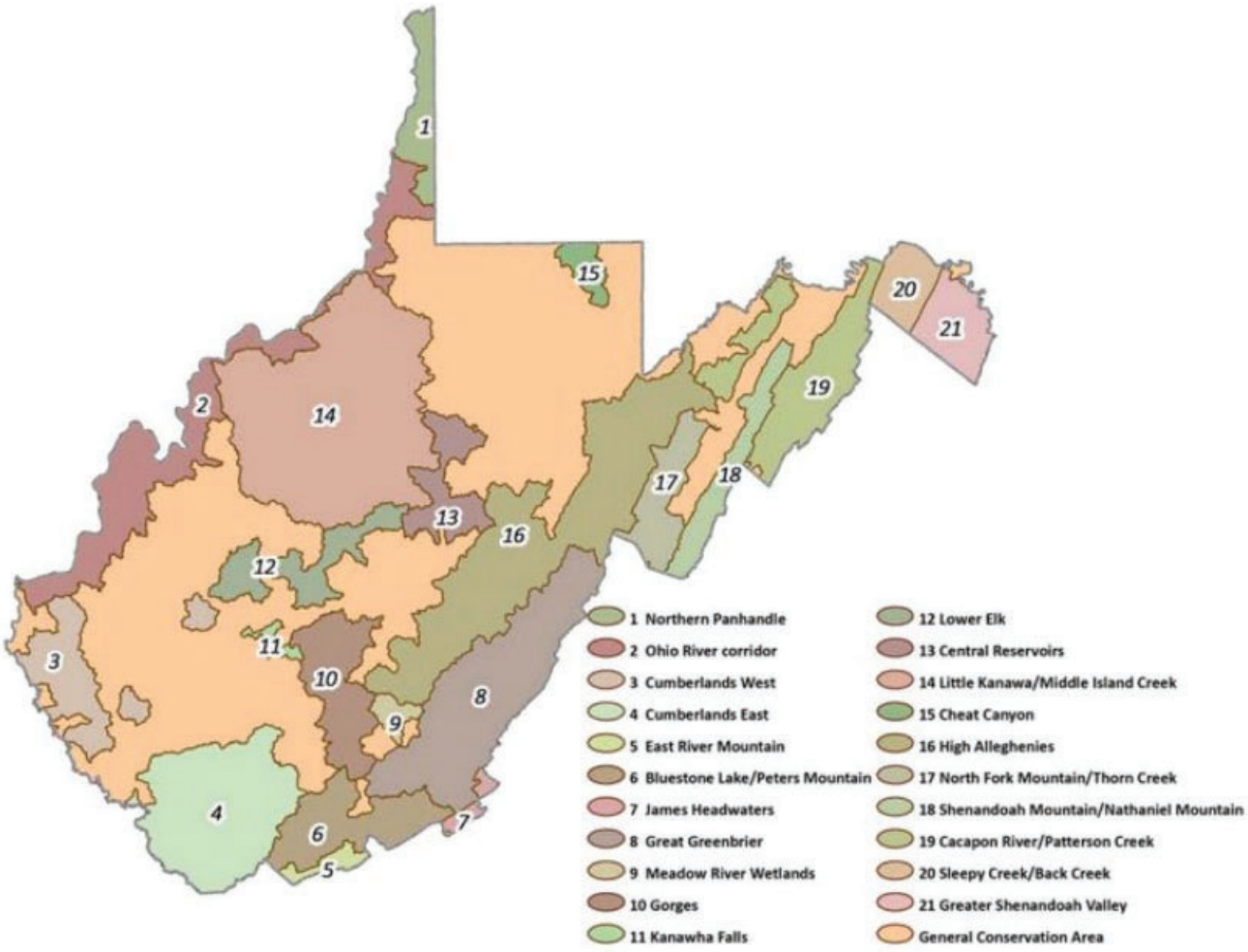
Many agencies and private landowners are using native alternatives for conservation purposes, and many West Virginia nurseries sell varieties derived from local communities to be sold as alternatives to exotic species.

Joe-Pye weed, a valuable native

[InvasivePlants.indd (wvdnr.gov)]

[listed species cheat sheet.xlsx (wvdnr.gov)]

WVDNR Conservation Focus Areas



[WV DNR Conservation Focus Areas]

Species of Greatest Conservation Need Found In Meadow River Watershed

Common Name	Scientific Name	Name Category	G Rank	S Rank
Acidic Sandstone Riverscour Shrub-Prairie	*Phanetta subterranea*	International Vegetation Classification - Natural	G2	S2
Alder Flycatcher	*Empidonax alnorum*	Vertebrate Animal	G5	S3B
Allegheny Mountain Dusky Salamander	*Desmognathus ochrophaeus*	Vertebrate Animal	G5	S4
Allegheny River Cruiser	*Macromia alleghaniensis*	Invertebrate Animal	G4	S2S3
Allegheny Woodrat	*Neotoma magister*	Vertebrate Animal	G3G4	S3
American Bur-Reed Marsh	*Sparganium (americanum, chlorocarpum) Marsh*	International Vegetation Classification - Natural	G3	S2
American Eel	*Anguilla rostrata*	Vertebrate Animal	G4	S2
American Kestrel	*Falco sparverius*	Vertebrate Animal	G5	S3BS3N
Appalachia Bellytooth	*Gastrodonta fonticula*	Invertebrate Animal	G3G4	S2
Appalachia Darter	*Percina gymnocephala*	Vertebrate Animal	G4	S2
Appalachian Jewelwing	*Calopteryx angustipennis*	Invertebrate Animal	G4	S3
Appalachian Thorn	*Carychium clappi*	Invertebrate Animal	G5	S4
Appalachian-Cumberland Sycamore - Birch Riverscour Woodland	*Platanus occidentalis - Betula nigra / Cornus amomum / (Andropogon gerardii, Chasmanthium latifolium) Floodplain Forest*	Fagus grandifolia - Acer saccharum / Lindera benzoin Floodplain Forest	G3	S3
Bald Eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	G5	S3BS3N
Balsam Globe	*Mesodon aff. andrewsae*	Invertebrate Animal	G4	S3
Balsam Ragwort	*Packera paupercula*	Vascular Plant	G5	S2
Baltimore Checkerspot	*Euphydryas phaeton*	Invertebrate Animal	G4	S3
Bear Creek Slitmouth	*Stenotrema simile*	Invertebrate Animal	G2	S2
Beautiful Barbara's-Buttons	*Marshallia pulchra*	Vascular Plant	G3	S2
Beech - Sugar Maple Floodplain Forest	*Fagus grandifolia - Acer saccharum / Lindera benzoin Floodplain Forest*	Fagus grandifolia - Acer saccharum / Lindera benzoin Floodplain Forest	G2G3	S1
Bidentate Dome	*Ventridens coelaxis*	Invertebrate Animal	G3	S1
Bigmouth Buffalo	*Ictiobus cyprinellus*	Vertebrate Animal	G5	S1
Black Ash	*Fraxinus nigra*	Vascular Plant	G5	S1
Black Buffalo	*Ictiobus niger*	Vertebrate Animal	G5	S2
Black Striate Snail	*Striatura ferrea*	Invertebrate Animal	G5	S3
Black Vulture	*Coragyps atratus*	Vertebrate Animal	G5	S4BS4N
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Vertebrate Animal	G5	S2B
Blackburnian Warbler	*Setophaga fusca*	Vertebrate Animal	G5	S3B
Black-girdle Bulrush	*Scirpus atrocinctus*	Vascular Plant	G5	S3
Blackseed Needlegrass	*Piptochaetium avenaceum*	Vascular Plant	G5	S2
Black-throated Blue Warbler	*Setophaga caerulescens*	Vertebrate Animal	G5	S3B
Blue-winged Warbler	*Vermivora cyanoptera*	Vertebrate Animal	G5	S3B
Blunt-lobe Grapefern	*Botrychium oneidense*	Vascular Plant	G4	S3S4
Bog Clubmoss	*Lycopodiella inundata*	Vascular Plant	G5	S2
Branching Bur-reed	*Sparganium androcladum*	Vascular Plant	G4G5	S2S3
Brilliant Granule Snail	*Guppya sterkii*	Invertebrate Animal	G5	S5
Bristled Slitmouth Snail	*Stenotrema barbatum*	Invertebrate Animal	G5	S3
Broadleaf Ironweed	*Vernonia glauca*	Vascular Plant	G5	S1
Broad-winged Hawk	*Buteo platypterus*	Vertebrate Animal	G5	S3B
Brome-like Sedge	*Carex bromoides*	Vascular Plant	G5	S3
Bronze Pinecone Snail	*Strobilops aeneus*	Invertebrate Animal	G5	SNR
Brown Beakrush	*Rhynchospora fusca*	Vascular Plant	G4G5	S1
Brown Bullhead	*Ameiurus nebulosus*	Vertebrate Animal	G5	S2

Common Name	Scientific Name	Name Category	G Rank	S Rank
Brown Creeper	*Certhia americana*	Vertebrate Animal	G5	S3BS4N
Brush Creek Threetooth	*Triodopsis juxtidens robinae*	Invertebrate Animal	G5T1	S1
Budded Threetooth	*Triodopsis tennesseensis*	Invertebrate Animal	G4	S3
Bullhead Minnow	*Pimephales vigilax*	Vertebrate Animal	G5	S2
Bushy Bluestem	*Andropogon glomeratus var. glomeratus*	Vascular Plant	G5T5	S4
Bushy St. Johnswort Shrub Swamp	*Hypericum densiflorum / Rubus hispidus Shrub Swamp*	International Vegetation Classification - Natural	GNR	S3
Canada Burnet	*Sanguisorba canadensis*	Vascular Plant	G5	S2S3
Canada Warbler	*Cardellina canadensis*	Vertebrate Animal	G5	S3B
Candy Darter	*Etheostoma osburni*	Vertebrate Animal	G3	S1
Carter Threetooth	*Triodopsis anteridon*	Invertebrate Animal	G3	S3
Cattail Sedge	*Carex typhina*	Vascular Plant	G5	S2
Central Appalachian Cutgrass Marsh	*Leersia oryzoides - Sagittaria latifolia Wet Meadow*	International Vegetation Classification - Natural	GNR	S3
Cerulean Warbler	*Setophaga cerulea*	Vertebrate Animal	G4	S2B
Chain Pickerel	*Esox niger*	Vertebrate Animal	G5	S3
Changeable Mantleslug	*Megapallifera mutabilis*	Invertebrate Animal	G5	SNR
Channel Darter	*Percina copelandi*	Vertebrate Animal	G4	S2S3
Cheat Mountain Salamander	*Plethodon nettingi*	Vertebrate Animal	G1G2	S2
Cheat Threetooth	*Triodopsis platysayoides*	Invertebrate Animal	G1	S1
Cherry Gall Azure	*Celastrina serotina*	Invertebrate Animal	G5	S2
Cherrystone Drop	*Hendersonia occulta*	Invertebrate Animal	G4	S3
Chimney Swift	*Chaetura pelagica*	Vertebrate Animal	G4G5	S3B
Cliff Swallow	*Petrochelidon pyrrhonota*	Vertebrate Animal	G5	S3B
Cliff Top Virginia Pine Forest	*Pinus virginiana - Nyssa sylvatica / Smilax rotundifolia - Vaccinium pallidum Forest*	International Vegetation Classification - Natural	G3	S2
Climbing Fern	*Lygodium palmatum*	Vascular Plant	G4	S3
Cobra Clubtail	*Gomphus vastus*	Invertebrate Animal	G5	S2
Comet Darner	*Anax longipes*	Invertebrate Animal	G5	S3
Common Black-bellied Salamander	*Desmognathus quadramaculatus*	Vertebrate Animal	G5	S3
Common Earthsnake	*Carphophis amoenus*	Vertebrate Animal	G4	S2
Common Mudpuppy	*Necturus maculosus maculosus*	Vertebrate Animal	G4	S2
Common Northern Sweet Grass	*Hierochloe hirta ssp. arctica*	Vascular Plant	G5T5	S1
Common Ribbonsnake	*Thamnophis saurita saurita*	Vertebrate Animal	G5T5	S2
Common Wormsnake	*Carphophis amoenus*	Vertebrate Animal	G5	S3
Creeping Spikerush	*Eleocharis palustris*	Vascular Plant	G5	S3
Cross Polygala	*Polygala cruciata var. aquilonia*	Vascular Plant	G5T4	S1
Cumberland Plateau Salamander	*Plethodon kentucki*	Vertebrate Animal	G4	S3
Cumberland Sedge	*Carex cumberlandensis*	Vascular Plant	GNR	S3S4
Diana Fritillary	*Argynnis diana*	Invertebrate Animal	G2	S2
Dimple Supercoil	*Paravitrea capsella*	Invertebrate Animal	G4	S4
Dusky Darter	*Percina sciera*	Vertebrate Animal	G5	S3
Dwarf Anemone	*Anemone quinquefolia var. minima*	Vascular Plant	G5T3	S2
Eastern Copperhead	*Agkistrodon contortrix mokasen*	Vertebrate Animal	G5	S2
Eastern Meadowlark	*Sturnella magna*	Vertebrate Animal	G5	S3BS2N
Eastern Spadefoot	*Scaphiopus holbrooki*	Vertebrate Animal	G5	S3
Eastern Whip-poor-will	*Antrostomus vociferus*	Vertebrate Animal	G5	S3B
Fat Hive Snail	*Euconulus polygyratus*	Invertebrate Animal	G5	S1
Few-flower Tick-trefoil	*Desmodium pauciflorum*	Vascular Plant	G5	S1
Field Sparrow	*Spizella pusilla*	Vertebrate Animal	G5	S3BS3N

Common Name	Scientific Name	Name Category	G Rank	S Rank
Fine-ribbed Striate Snail	*Striatura milium*	Invertebrate Animal	G5	S3
Flat Bladetooth Snail	*Patera appressa*	Invertebrate Animal	G5	S4
Flat Dome Snail	*Ventridens suppressus*	Invertebrate Animal	G5	S3
Forest Disc Snail	*Discus whitneyi*	Invertebrate Animal	G5	S2
Forked Rush	*Juncus dichotomus*	Vascular Plant	G5	S1
Fowler's Toad	*Bufo fowleri*	Vertebrate Animal	G5	S5
Fraser's Sedge	*Cymophyllus fraserianus*	Vascular Plant	G4	S3
Fraudulent Slitmouth	*Stenotrema macgregori*	Invertebrate Animal	GNR	S2
Ghost Shiner	*Notropis buchanani*	Vertebrate Animal	G5	S3
Glossy Dome	*Ventridens acerra*	Invertebrate Animal	G4	S2
Golden Dome	*Ventridens arcellus*	Invertebrate Animal	G4	S3
Goldenrod - Goldentop - Dewberry Wet Meadow	*Solidago rugosa - Euthamia graminifolia Wet Meadow*	International Vegetation Classification - Natural	GNR	S3
Goldeye	*Hiodon alosoides*	Vertebrate Animal	G5	S1
Gray Comma	*Polygonia progne*	Invertebrate Animal	G5	S2
Gray Petaltail	*Tachopteryx thoreyi*	Invertebrate Animal	G4	S3
Greater Straw Sedge	*Carex normalis*	Vascular Plant	G5	S3
Green Heron	*Butorides virescens*	Vertebrate Animal	G5	S3B
Green Salamander	*Aneides aeneus*	Vertebrate Animal	G3G4	S3
Green-faced Clubtail	*Gomphus viridifrons*	Invertebrate Animal	G3	S3
Greenish-white Sedge	*Carex longii*	Vascular Plant	G5	S1
Hairy-fruit Sedge	*Carex trichocarpa*	Vascular Plant	G4	S1
Harris's Checkerspot	*Chlosyne harrisii*	Invertebrate Animal	G5	S3
Hellbender	*Cryptobranchus alleganiensis*	Vertebrate Animal	G3	S2
Hemlock Floodplain Forest	*Tsuga canadensis - Quercus rubra - (Betula nigra) / Rhododendron maximum Floodplain Forest*	International Vegetation Classification - Natural	GNR	S2
Hemlock Witchgrass	*Dichanthelium sabulorum var. thinium*	Vascular Plant	G5T5	S1
High-spire Column Snail	*Columella simplex*	Invertebrate Animal	G5	S5
Inland Slitmouth	*Stenotrema stenotrema*	Invertebrate Animal	G5	SNR
Iroquois Vallonia Snail	*Vallonia excentrica*	Invertebrate Animal	G5	S3
Jefferson Salamander	*Ambystoma jeffersonianum*	Vertebrate Animal	G4	S2
Kanawha Minnow	*Phenacobius teretulus*	Vertebrate Animal	G3G4	S1
Kanawha Sculpin	*Cottus kanawhae*	Vertebrate Animal	G4	S2
Lake-bank Sedge	*Carex lacustris*	Vascular Plant	G5	S2
Lanceleaf Loosestrife	*Lysimachia hybrida*	Vascular Plant	G5	S1
Long-stalk Holly	*Ilex collina*	Vascular Plant	G3	S2
Longtail Salamander	*Eurycea longicauda*	Vertebrate Animal	G5	S5
Long-tailed Shrew	*Sorex dispar*	Vertebrate Animal	G4	S2S3
Louisiana Waterthrush	*Parkesia motacilla*	Vertebrate Animal	G5	S3B
Lovely Vallonia Snail	*Vallonia pulchella*	Invertebrate Animal	G5	S3
Marbled Salamander	*Ambystoma opacum*	Vertebrate Animal	G5	S4
Marsh Speedwell	*Veronica scutellata*	Vascular Plant	G5	S2
Meadow Evening-primrose	*Oenothera pilosella ssp. pilosella*	Vascular Plant	G5T5	S2
Meadow Jumping Mouse	*Zapus hudsonius*	Vertebrate Animal	G5	S3
Meadow River Floodplain Pin Oak Swamp	*Quercus palustris - (Fraxinus nigra) / Cornus amomum / Carex bromoides Forested Swamp*	International Vegetation Classification - Natural	GNR	S1
Meadow River Mudbug	*Cambarus pauleyi*	Invertebrate Animal	GNR	S2
Midland Mud Salamander	*Pseudotriton montanus diastictus*	Vertebrate Animal	G5T5	S1
Mountain Chorus Frog	Pseudacris brachyphona	Vertebrate Animal	GNR	S4
New River Crayfish	*Cambarus chasmodactylus*	Invertebrate Animal	G4	S3
New River Shiner	*Notropis scabriceps*	Vertebrate Animal	G4	S2

Common Name	Scientific Name	Name Category	G Rank	S Rank
Nodding Pogonia	*Triphora trianthophora*	Vascular Plant	G4	S2
North American Least Shrew	*Cryptotis parva*	Vertebrate Animal	G5	S2
Northern Dusky Salamander	*Desmognathus fuscus*	Vertebrate Animal	G5	S5
Northern Dusky Salamander	*Desmognathus fuscus fuscus*	Vertebrate Animal	G5	S3
Northern Goshawk	*Accipiter gentilis*	Vertebrate Animal	G5	S1BS1N
Northern Red Salamander	*Pseudotriton ruber ruber*	Vertebrate Animal	G5T5	S3
Northern Ring-necked Snake	*Diadophis punctatus edwardsii*	Vertebrate Animal	G5T5	S5
Northern Saw-whet Owl	*Aegolius acadicus*	Vertebrate Animal	G5	S2BS2N
Northern Spring Azure	*Celastrina lucia*	Invertebrate Animal	G5	S3
Northern Spring Salamander	*Gyrinophilus porphyriticus porphyriticus*	Vertebrate Animal	G5T5	S5
Northern Two-lined Salamander	*Eurycea bislineata*	Vertebrate Animal	G5	S5
Northern Waterthrush	*Parkesia noveboracensis*	Vertebrate Animal	G5	S2
Ohio River Silver Maple Floodplain Forest	*Acer saccharinum / Toxicodendron radicans / Boehmeria cylindrica Floodplain Forest*	International Vegetation Classification - Natural	G4	S2
Orangespotted Sunfish	*Lepomis humilis*	Vertebrate Animal	G5	S1
Osprey	*Pandion haliaetus*	Vertebrate Animal	G5	S2B
Paddlefish	*Polyodon spathula*	Vertebrate Animal	G4	S1
Pine Siskin	*Spinus pinus*	Vertebrate Animal	G5	S2
Prairie Warbler	*Setophaga discolor*	Vertebrate Animal	G5	S3B
Purple Fringeless Orchid	*Platanthera peramoena*	Vascular Plant	G5	S2
Rapids Clubtail	*Gomphus quadricolor*	Invertebrate Animal	G5	S2
Red Crossbill	*Loxia curvirostra*	Vertebrate Animal	G5	S2BS2N
Red Maple - White Oak Forest Seep	*Acer rubrum - Nyssa sylvatica - Quercus alba / Osmunda cinnamomea - Thelypteris noveboracensis Forest Seep*	International Vegetation Classification - Natural	G2	S2
Red-banded Hairstreak	*Calycopis cecrops*	Invertebrate Animal	G5	S3
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Vertebrate Animal	G5	S3BS3N
Ribbed Striate Snail	*Striatura exigua*	Invertebrate Animal	G5	S2
Ridge-and-valley Slitmouth	*Stenotrema edvardsi*	Invertebrate Animal	G4G5	S3
River Carpsucker	*Carpiodes carpio*	Vertebrate Animal	G5	S3
River Darter	*Percina shumardi*	Vertebrate Animal	G5	S1
River Redhorse	*Moxostoma carinatum*	Vertebrate Animal	G4	S3
River Shiner	*Notropis blennius*	Vertebrate Animal	G5	S2
Roundleaf Sundew	*Drosera rotundifolia var. rotundifolia*	Vascular Plant	G5T5	S3
Sculptured Dome	*Ventridens collisella*	Invertebrate Animal	G4	S3
Seal Salamander	*Desmognathus monticola*	Vertebrate Animal	G5	S5
Sealed Globelet Snail	*Mesodon mitchellianus*	Invertebrate Animal	G4	S3
Shagreen Snail	*Inflectarius inflectus*	Invertebrate Animal	G5	S2
Shining Ladies'-tresses	*Spiranthes lucida*	Vascular Plant	G4	S1S2
Shoal Chub	*Macrhybopsis hyostoma*	Vertebrate Animal	G5	S2
Silky Oatgrass	*Danthonia sericea*	Vascular Plant	G5	S1
Silver Chub	*Macrhybopsis storeriana*	Vertebrate Animal	G5	S3
Silver Lamprey	*Ichthyomyzon unicuspis*	Vertebrate Animal	G5	S2S3
Silver-haired Bat	*Lasionycteris noctivagans*	Vertebrate Animal	G3G4	S2
Slender Spikerush	*Eleocharis elliptica*	Vascular Plant	G5	S1
Slenderhead Darter	*Percina phoxocephala*	Vertebrate Animal	G5	S1
Slimy Salamander	*Plethodon glutinosus*	Vertebrate Animal	G5	S5
Slimy Salamander	*Plethodon glutinosus glutinosus*	Vertebrate Animal	G5	S3
Smooth Blue Aster	*Symphyotrichum laeve var. laeve*	Vascular Plant	G5T5	S3
Smooth Button	*Mesomphix perlaevis*	Invertebrate Animal	G4G5	S3
Smooth Greensnake	*Opheodrys vernalis*	Vertebrate Animal	G5	S5

Common Name	Scientific Name	Name Category	G Rank	S Rank
Smooth Hedge-nettle	*Stachys tenuifolia*	Vascular Plant	G5	S3
Southeastern Tigersnail	*Anguispira strongylodes*	Invertebrate Animal	G5	S2
Southern Dwarf Huckleberry	*Gaylussacia dumosa*	Vascular Plant	G5	S1
Southern Redbelly Dace	*Chrosomus erythrogaster*	Vertebrate Animal	G5	S2S3
Southern Rock Vole	*Microtus chrotorrhinus carolinensis*	Vertebrate Animal	G5T3	S2
Southern Spreadwing	*Lestes australis*	Invertebrate Animal	G5	S3
Split-tooth Dome	*Ventridens virginicus*	Invertebrate Animal	G4	S3
Spotted Sandpiper	*Actitis macularius*	Vertebrate Animal	G5	S2B
Spruce Knob Threetooth	*Triodopsis picea*	Invertebrate Animal	G3	S3
Star Tickseed	*Coreopsis pubescens var. pubescens*	Vascular Plant	G5T4T5	S2
Sticky Golden-rod	*Solidago simplex ssp. randii var. racemosa*	Vascular Plant	G5T3	S2
Straw Sedge	*Carex straminea*	Vascular Plant	G5	S2
Striped Whitelip	*Webbhelix multilineata*	Invertebrate Animal	G5	S1
Suboval Ambersnail	*Catinella vermeta*	Invertebrate Animal	G5	S3
Suckermouth Minnow	*Phenacobius mirabilis*	Vertebrate Animal	G5	S3
Summer Sedge	*Carex aestivalis*	Vascular Plant	G4	S3S4
Swainson's Thrush	*Catharus ustulatus*	Vertebrate Animal	G5	S3B
Swainson's Warbler	*Limnothlypis swainsonii*	Vertebrate Animal	G4	S3B
Swamp Lousewort	*Pedicularis lanceolata*	Vascular Plant	G5	S2
Synchronous Firefly	*Photinus carolinus*	Invertebrate Animal	G4	S2S3
Temperate Coil Snail	*Helicodiscus shimeki*	Invertebrate Animal	G4G5	S2
Tennessee Pondweed	*Potamogeton tennesseensis*	Vascular Plant	G2G3	S2
Tessellated Darter	*Etheostoma olmstedi*	Vertebrate Animal	G5	S1S2
Thin-lip Vallonia Snail	*Vallonia perspectiva*	Invertebrate Animal	G4G5	S3
Threeway Sedge Fen	*Dulichium arundinaceum Fen*	International Vegetation Classification - Natural	GNR	S1
Tight Coil	*Helicodiscus notius*	Invertebrate Animal	G5	S5
Timber Rattlesnake	*Crotalus horridus*	Vertebrate Animal	G4	S3
Tonguetied Minnow	*Exoglossum laurae*	Vertebrate Animal	G4	S2
Tricolored Bat	*Perimyotis subflavus*	Vertebrate Animal	G3G4	S2
Troublesome Sedge	*Carex molesta*	Vascular Plant	G4	S2S3
Tuberous Grass-pink	*Calopogon tuberosus var. tuberosus*	Vascular Plant	G5T5	S1
Tuckerman's Sedge	*Carex tuckermanii*	Vascular Plant	G5	S1
Tussock Sedge Wet Meadow	*Carex stricta Wet Meadow*	International Vegetation Classification - Natural	G4G5	S3
Uhler's Sundragon	*Helocordulia uhleri*	Invertebrate Animal	G5	S2S3
Upland Chorus Frog	*Pseudacris feriarum*	Vertebrate Animal	G5	S3
Upland Chorus Frog	*Pseudacris feriarum feriarum*	Vertebrate Animal	G5	S2
Variable Vertigo Snail	*Vertigo gouldii*	Invertebrate Animal	G5	SNR
Veery	*Catharus fuscescens*	Vertebrate Animal	G5	S3B
Velvet Wedge Snail	*Xolotrema denotatum*	Invertebrate Animal	G5	SNR
Vesper Bluet	*Enallagma vesperum*	Invertebrate Animal	G5	S3
Vesper Sparrow	*Pooecetes gramineus*	Vertebrate Animal	G5	S2BS2N
Virginia Bladetooth	*Patera panselenus*	Invertebrate Animal	G3	S4
Virginia Spiraea	*Spiraea virginiana*	Vascular Plant	G2	S1
Water Smartweed	*Polygonum amphibium*	Vascular Plant	G5	S3S4
Weakstalk Bulrush	*Schoenoplectiella purshiana*	Vascular Plant	G4G5	S3
Wehrle's Salamander	*Plethodon wehrlei*	Vertebrate Animal	G4	S4

Common Name	Scientific Name	Name Category	G Rank	S Rank
Western Plateaus Dry Sandstone Cliff	*Lepraria (normandinioides, finkii, cryophila) - Phlyctis petraea - Porpidia albocaerulescens Dry Sandstone Cliff*	International Vegetation Classification - Natural	G4Q	S2
White-faced Meadowhawk	*Sympetrum obtrusum*	Invertebrate Animal	G5	S3
White-m Hairstreak	*Parrhasius m-album*	Invertebrate Animal	G5	S3
White-spotted Slimy Salamander	*Plethodon cylindraceus*	Vertebrate Animal	G5	S5
White-tubed Colicroot	*Aletris farinosa*	Vascular Plant	G5	S1S2
Winding Mantleslug	*Philomycus flexuolaris*	Invertebrate Animal	G5	SNR
Wood Thrush	*Hylocichla mustelina*	Vertebrate Animal	G4	S3B
Woodland Box Turtle	*Terrapene carolina carolina*	Vertebrate Animal	G5T5	S5
Woolly Sedge	*Carex pellita*	Vascular Plant	G5	S2
Yellow Birch - (Hemlock, Tuliptree) Cold Cove Forest	*Betula alleghaniensis - (Tsuga canadensis, Liriodendron tulipifera) / Rhododendron maximum Forest*	International Vegetation Classification - Natural	G3	S2
Yellow Fringed Orchid	*Platanthera ciliaris*	Vascular Plant	G5	S3
Yellow-breasted Chat	*Icteria virens*	Vertebrate Animal	G5	S3B

Definitions for interpreting NatureServe's global (range-wide) conservation status ranks can be found at the following: Statuses | NatureServe Explorer

Nonindigenous Aquatic Species

Specimen ID	Date Reported	Species	New Area
1657347	5/10/2021	White River Crayfish *Procambarus acutus*	County: Greenbrier (WV) Drainage: Gauley (05050005)

Invasive Species

Animals:

Common Name	Scientific Name
American bullfrog	*Lithobates catesbeianus*
pig (feral), wild boar at large	*Sus scrofa (feral type)*
wandering broadhead planarian	*Bipalium adventitium*

Diseases:

Common Name	Scientific Name
beech bark disease	*Neonectria faginata*
butternut canker	*Ophiognomonia clavigignenti-juglandacearum*
chestnut blight or canker	*Cryphonectria parasitica*
cucurbit downy mildew	*Pseudoperonospora cubensis*
dogwood anthracnose	*Discula destructive*
oak wilt	*Bretziella fagacearum*
Phytophthora root rot	*Phytophthora cinnamomi*
rose rosette disease (RRD)	*Emaravirus RRD*
white pine blister rust	*Cronartium ribicola*

Insects:

Common Name	Scientific Name
Asian gypsy moth	*Lymantria dispar asiatica*
Asiatic oak weevil	*Cyrtepistomus castaneus*
bark beetle	*Hylastes opacus*
black vine weevil	*Otiorhynchus sulcatus*
brown marmorated stink bug	*Halyomorpha halys*
common pine shoot beetle, larger pine shoot beetle	*Tomicus piniperda*
emerald ash borer	*Agrilus planipennis*
green stink bug	*Chinavia hilaris*
hemlock woolly adelgid	*Adelges tsugae*
imported willow leaf beetle	*Plagiodera versicolora*
Japanese beetle	*Popillia japonica*
multicolored Asian lady beetle	*Harmonia axyridis*
southern pine beetle	*Dendroctonus frontalis*
spongy moth (formerly gypsy moth)	*Lymantria dispar*
spruce beetle	*Dendroctonus rufipennis*

Plants:

Common Name	Scientific Name
alfalfa	*Medicago sativa*
alfalfa	*Medicago sativa ssp. sativa*
alsike clover	*Trifolium hybridum*
American burnweed	*Erechtites hieraciifolius*
Amur honeysuckle	*Lonicera maackii*
annual bluegrass	*Poa annua*
annual honesty	*Lunaria annua*
annual ragweed	*Ambrosia artemisiifolia var. elatior*
annual sowthistle	*Sonchus oleraceus*
apple-of-Peru	*Nicandra physalodes*
Asiatic dayflower	*Commelina communis*
asparagus	*Asparagus officinalis*
autumn olive	*Elaeagnus umbellate*
bald brome	*Bromus racemosus*
balsam poplar	*Populus balsamifera*
barnyardgrass	*Echinochloa crus-galli*
bermudagrass	*Cynodon dactylon*
big chickweed	*Cerastium fontanum ssp. vulgare*
bigroot morning-glory	*Ipomoea pandurate*
birdsfoot trefoil	*Lotus corniculatus*
birdsrape mustard	*Brassica rapa*
bittersweet nightshade	*Solanum dulcamara*
bittersweets	*Celastrus spp.*
black knapweed	*Centaurea nigra*
black locust	*Robinia pseudoacacia*
black medic	*Medicago lupulina*
black mustard	*Brassica nigra*
bladder campion	*Silene vulgaris*
bladder senna	*Colutea arborescens*
bluebuttons, field scabious	*Knautia arvensis*
border privet	*Ligustrum obtusifolium*
boreal chickweed	*Cerastium tomentosum*
bouncingbet	*Saponaria officinalis*
bristlegrass	*Setaria spp.*
bristly locust	*Robinia hispida*
British yellowhead	*Inula britannica*
brittleleaf naiad	*Najas minor*
broadleaf dock	*Rumex obtusifolius*
broadleaf plantain	*Plantago major*
broomsedge bluestem	*Andropogon virginicus*
brown knapweed	*Centaurea jacea*

Common Name	Scientific Name
buckhorn plantain	*Plantago lanceolata*
buckwheat	*Fagopyrum esculentum*
bulbous buttercup	*Ranunculus bulbosus*
bull thistle	*Cirsium vulgare*
burcucumber	*Sicyos angulatus*
bush honeysuckles (exotic)	*Lonicera spp.*
bushy wallflower	*Erysimum repandum*
butterflybush	*Buddleja davidii*
California privet	*Ligustrum ovalifolium*
Callery pear (Bradford pear)	*Pyrus calleryana*
Canada bluegrass	*Poa compressa*
Canada thistle	*Cirsium arvense*
Canadian horseweed	*Erigeron canadensis*
canarygrass	*Phalaris canariensis*
carpet bugle	*Ajuga reptans*
catnip	*Nepeta cataria*
cheatgrass, downy brome	*Bromus tectorum*
chicory	*Cichorium intybus*
Chinese catalpa	*Catalpa ovata*
Chinese silvergrass	*Miscanthus sinensis*
Chinese wisteria	*Wisteria sinensis*
Chinese yam	*Dioscorea polystachya*
clover dodder	*Cuscuta epithymum*
colonial bentgrass	*Agrostis capillaris*
coltsfoot	*Tussilago farfara*
common buckthorn, European buckthorn	*Rhamnus cathartica*
common burdock, lesser burdock	*Arctium minus*
common chickweed	*Stellaria media*
common chickweed	*Stellaria pallida*
common cocklebur	*Xanthium strumarium*
common cornsalad	*Valerianella locusta*
common dandelion	*Taraxacum officinale ssp. officinale*
common duckweed	*Lemna minor*
common flax	*Linum usitatissimum*
common groundsel	*Senecio vulgaris*
common mallow	*Malva neglecta*
common mouse-ear chickweed	*Cerastium fontanum*
common mullein	*Verbascum Thapsus*
common pear	*Pyrus communis*
common periwinkle	*Vinca minor*
common pokeweed	*Phytolacca americana*
common purslane	*Portulaca oleracea*

Common Name	Scientific Name
common ragweed	*Ambrosia artemisiifolia*
common salsify	*Tragopogon porrifolius*
common selfheal	*Prunella vulgaris*
common speedwell	*Veronica officinalis*
common St. Johnswort	*Hypericum perforatum*
common teasel	*Dipsacus fullonum*
common velvetgrass	*Holcus lanatus*
common vetch	*Vicia sativa*
common viper's bugloss, blueweed	*Echium vulgare*
corn chamomile	*Anthemis arvensis*
corn cockle	*Agrostemma githago*
corn gromwell	*Buglossoides arvensis*
corn poppy	*Papaver rhoeas*
corn speedwell	*Veronica arvensis*
corn spurry	*Spergula arvensis*
crack willow	*Salix fragilis*
cranberry viburnum, European highbush cranberry	*Viburnum opulus ssp. opulus*
creeping bellflower	*Campanula rapunculoides*
creeping bentgrass	*Agrostis stolonifera*
creeping buttercup	*Ranunculus repens*
creeping yellow loosestrife, creeping Jenny	*Lysimachia nummularia*
crested latesummer mint	*Elsholtzia ciliate*
cup rosinweed	*Silphium perfoliatum*
curly dock	*Rumex crispus*
curly dock	*Rumex crispus ssp. crispus*
curly leaf pondweed	*Potamogeton crispus*
cutleaf blackberry	*Rubus laciniatus*
cutleaf evening-primrose	*Oenothera laciniata*
cutleaf teasel	*Dipsacus laciniatus*
cypress spurge	*Euphorbia cyparissias*
dallisgrass	*Paspalum dilatatum*
dames rocket	*Hesperis matronalis*
dandelion	*Taraxacum officinale*
Deptford pink	*Dianthus armeria*
dog mustard	*Erucastrum gallicum*
dog rose	*Rosa canina*
dotted smartweed	*Persicaria punctata*
dwarf honeysuckle	*Lonicera xylosteum*
dwarf snapdragon	*Chaenorhinum minus*
dwarf violet iris	*Iris verna*
eastern poison-ivy	*Toxicodendron radicans*
eastern redcedar	*Juniperus virginiana*

Common Name	Scientific Name
eastern white pine	*Pinus strobus*
eclipta	*Eclipta prostrata*
elecampane	*Inula helenium*
English daisy	*Bellis perennis*
English ivy	*Hedera helix*
European columbine	*Aquilegia vulgaris*
European common reed, Phragmites	*Phragmites australis ssp. australis*
European cranberrybush	*Viburnum opulus*
European privet	*Ligustrum vulgare*
European red raspberry	*Rubus idaeus*
European speedwell	*Veronica beccabunga*
European spindletree	*Euonymus europaeus*
European stinging nettle	*Urtica dioica ssp. dioica*
European water-clover	*Marsilea quadrifolia*
everlasting peavine	*Lathyrus latifolius*
fall panicum	*Panicum dichotomiflorum*
false strawberry	*Potentilla indica*
field bindweed	*Convolvulus arvensis*
field brome	*Bromus arvensis*
field dodder	*Cuscuta pentagona*
field horsetail	*Equisetum arvense*
field madder	*Sherardia arvensis*
field pennycress	*Thlaspi arvense*
field pepperweed	*Lepidium campestre*
field thistle	*Cirsium discolor*
fiveangled dodder	*Cuscuta pentagona var. pentagona*
fortune meadowsweet	*Spiraea japonica var. fortune*
foxglove	*Digitalis purpurea*
foxtail millet	*Setaria italica*
garden loosestrife	*Lysimachia vulgaris*
garlic mustard	*Alliaria petiolate*
giant chickweed	*Myosoton aquaticum*
giant foxtail	*Setaria faberi*
giant knotweed	*Reynoutria sachalinensis*
giant ragweed	*Ambrosia trifida*
giant reed	*Arundo donax*
giantseed goosefoot	*Chenopodium simplex*
glossy buckthorn	*Frangula alnus*
goosegrass	*Eleusine indica*
goutweed	*Aegopodium podagraria*
grassy arrowhead	*Sagittaria graminea*
greater celandine	*Chelidonium majus*

Common Name	Scientific Name
Grecian foxglove	*Digitalis lanata*
green bristlegrass	*Setaria viridis var. viridis*
green foxtail	*Setaria viridis*
ground ivy	*Glechoma hederacea*
hairy cat's ear	*Hypochaeris radicata*
hairy galinsoga	*Galinsoga quadriradiata*
hairy vetch	*Vicia villosa*
hedge bindweed	*Calystegia sepium*
hedge maple	*Acer campestre*
hedge mustard	*Sisymbrium officinale*
hemp dogbane	*Apocynum cannabinum*
hemp/marijuana (sativa)	*Cannabis sativa*
henbit	*Lamium amplexicaule*
highbush blackberry	*Rubus argutus*
hoary alyssum	*Berteroa incana*
hop clover	*Trifolium aureum*
horsenettle	*Solanum carolinense*
houndstongue	*Cynoglossum officinale*
hydrilla	*Hydrilla verticillate*
Indian mustard	*Brassica juncea*
ivyleaf morning-glory	*Ipomoea hederacea*
Japanese barberry	*Berberis thunbergia*
Japanese clover	*Kummerowia striata*
Japanese hedge-parsley, erect hedgeparsley	*Torilis japonica*
Japanese honeysuckle	*Lonicera japonica*
Japanese hop	*Humulus japonicus*
Japanese knotweed	*Reynoutria japonica*
Japanese snowball	*Viburnum plicatum*
Japanese spiraea	*Spiraea japonica*
Japanese stiltgrass	*Microstegium vimineum*
jimsonweed	*Datura stramonium*
johnsongrass	*Sorghum halepense*
Kentucky bluegrass	*Poa pratensis*
knotroot foxtail	*Setaria parviflora*
knotweed species (nonnative)	*Reynoutria spp.*
Korean lespedeza	*Kummerowia stipulacea*
kudzu	*Pueraria montana var. lobata*
Kummerowia	*Kummerowia spp.*
ladysthumb	*Persicaria maculosa*
lambsquarters	*Chenopodium album*
large crabgrass	*Digitaria sanguinalis*
large hop clover	*Trifolium campestre*

Common Name	Scientific Name
largeseed falseflax	*Camelina sativa*
lemon balm	*Melissa officinalis*
lesser swinecress	*Coronopus didymus*
lily of the valley	*Convallaria majalis*
little starwort	*Stellaria graminea*
Lombardy poplar	*Populus nigra*
longleaf groundcherry	*Physalis longifolia*
longspine sandbur	*Cenchrus longispinus*
longstalk cranesbill	*Geranium columbinum*
low cudweed	*Gnaphalium uliginosum*
Mahaleb cherry	*Prunus mahaleb*
marsh-pepper smartweed	*Persicaria hydropiper*
meadow fescue	*Festuca pratensis*
meadow hawkweed	*Hieracium caespitosum*
meadow salsify	*Tragopogon lamottei*
memorial rose	*Rosa lucieae*
mexicantea	*Dysphania ambrosioides*
mimosa	*Albizia julibrissin*
moist sowthistle	*Sonchus arvensis ssp. uliginosus*
Morrow's honeysuckle	*Lonicera morrowii*
moth mullein	*Verbascum blattaria*
motherwort	*Leonurus cardiaca*
mouse-eared hawkweed	*Pilosella officinarum*
mugwort	*Artemisia vulgaris*
multiflora rose	*Rosa multiflora*
musk mallow	*Malva moschata*
musk thistle, nodding thistle	*Carduus nutans*
narrow-leaved cattail	*Typha angustifolia*
narrowleaf bittercress	*Cardamine impatiens*
nimblewill	*Muhlenbergia schreberi*
nipplewort	*Lapsana communis*
northern catalpa	*Catalpa speciosa*
northern white cedar	*Thuja occidentalis*
Norway maple	*Acer platanoides*
Norway spruce	*Picea abies*
orchardgrass	*Dactylis glomerata*
oriental bittersweet	*Celastrus orbiculatus*
Oriental lady's thumb	*Persicaria longiseta*
Oriental lady's thumb	*Polygonum posumbu*
osage-orange	*Maclura pomifera*
oxeye daisy	*Leucanthemum vulgare*
pale smartweed	*Polygonum lapathifolium*

Common Name	Scientific Name
pale yellow iris, yellow flag iris	*Iris pseudacorus*
paper-mulberry	*Broussonetia papyrifera*
paradise apple	*Malus pumila*
parrotfeather	*Myriophyllum aquaticum*
peach	*Prunus persica*
peppermint	*Mentha x piperita*
perennial ryegrass	*Lolium perenne*
perennial ryegrass	*Lolium perenne ssp. perenne*
perennial sowthistle	*Sonchus arvensis*
perilla mint	*Perilla frutescens*
periwinkle	*Vinca spp.*
petty spurge	*Euphorbia peplus*
piedmont bedstraw	*Cruciata pedemontana*
pineapple-weed	*Matricaria discoidea*
pitted morning-glory	*Ipomoea lacunose*
poison hemlock	*Conium maculatum*
poverty brome	*Bromus sterilis*
prickly lettuce	*Lactuca serriola*
princess-feather	*Persicaria orientalis*
princesstree	*Paulownia tomentosa*
privet	*Ligustrum spp.*
prostrate knotweed	*Polygonum aviculare*
purple crown-vetch	*Securigera varia*
purple cudweed	*Gamochaeta purpurea*
purple deadnettle	*Lamium purpureum*
purple loosestrife	*Lythrum salicaria*
purpleosier willow	*Salix purpurea*
quackgrass	*Elymus repens*
Queen Anne's lace, wild carrot	*Daucus carota*
rabbitfoot clover	*Trifolium arvense*
rapeseed	*Brassica napus*
red clover	*Trifolium pratense*
red fescue	*Festuca rubra*
red morning-glory	*Ipomoea coccinea*
red sorrel	*Rumex acetosella*
redstem filaree	*Erodium cicutarium*
redstem stork's bill	*Erodium cicutarium ssp. cicutarium*
redtop	*Agrostis gigantea*
reed canarygrass	*Phalaris arundinacea*
rock dandelion	*Taraxacum erythrospermum*
rose of Sharon	*Hibiscus syriacus*
roughstalk bluegrass	*Poa trivialis*

Common Name	Scientific Name
rush skeletonweed	*Chondrilla juncea*
Russian thistle	*Salsola tragus*
rye brome	*Bromus secalinus*
salad burnet	*Sanguisorba minor*
scarlet pimpernel	*Anagallis arvensis*
Scotch broom	*Cytisus scoparius*
Scots pine	*Pinus sylvestris*
Seaside rose	*Rosa rugosa*
sensitive partridgepea	*Chamaecrista nictitans*
sericea lespedeza	*Lespedeza cuneata*
shepherd's-purse	*Capsella bursa-pastoris*
showy fly honeysuckle, Bell's honeysuckle	*Lonicera x bella*
shrubby lespedeza	*Lespedeza bicolor*
Siberian elm	*Ulmus pumila*
Siebold's arrowwood	*Viburnum sieboldii*
silvery cinquefoil	*Potentilla argentea*
small carpetgrass, joint-head grass	*Arthraxon hispidus*
small hop clover	*Trifolium dubium*
smallseed falseflax	*Camelina microcarpa*
smooth bedstraw	*Galium mollugo*
smooth brome	*Bromus inermis*
smooth hawksbeard	*Crepis capillaris*
sour cherry	*Prunus cerasus*
southern catalpa	*Catalpa bignonioides*
spanishneedles	*Bidens bipinnata*
spearmint	*Mentha spicata*
spiny amaranth	*Amaranthus spinosus*
spiny plumeless thistle	*Carduus acanthoides*
spiny sowthistle	*Sonchus asper*
splitlip hempnettle	*Galeopsis bifida*
spotted deadnettle	*Lamium maculatum*
spotted knapweed	*Centaurea stoebe ssp. micranthos*
spotted spurge	*Euphorbia maculate*
spotted waterhemlock	*Cicuta maculate*
spreading hedgeparsley	*Torilis arvensis*
spreading hedgeparsley	*Torilis arvensis ssp. arvensis*
spring whitlowgrass	*Draba verna*
star-of-Bethlehem	*Ornithogalum umbellatum*
sticky chickweed	*Cerastium glomeratum*
stinging nettle	*Urtica dioica*
stinkgrass	*Eragrostis cilianensis*
stinking chamomile	*Anthemis cotula*

Common Name	Scientific Name
strawberry raspberry	*Rubus illecebrosus*
sulfur cinquefoil	*Potentilla recta*
sweet autumn virginsbower	*Clematis terniflora*
sweet cherry	*Prunus avium*
sweet vernalgrass	*Anthoxanthum odoratum*
sweetbriar	*Rosa rubiginosa*
tall buttercup	*Ranunculus acris*
tall fescue	*Festuca arundinacea*
tall lettuce	*Lactuca canadensis*
tall morning-glory	*Ipomoea purpurea*
tall oatgrass	*Arrhenatherum elatius*
tall thistle	*Cirsium altissimum*
Tatarian honeysuckle	*Lonicera tatarica*
tawny daylily	*Hemerocallis fulva*
thoroughwort pennycress	*Microthlaspi perfoliatum*
thymeleaf sandwort	*Arenaria serpyllifolia*
thymeleaf speedwell	*Veronica serpyllifolia*
thymeleaf speedwell	*Veronica serpyllifolia ssp. serpyllifolia*
timothy	*Phleum pratense*
toothed spurge	*Euphorbia dentata*
tree-of-heaven	*Ailanthus altissima*
true forget-me-not	*Myosotis scorpioides*
tumble mustard	*Sisymbrium altissimum*
twoleaf watermilfoil	*Myriophyllum heterophyllum*
velvetleaf	*Abutilon theophrasti*
Venice mallow	*Hibiscus trionum*
Virginia pepperweed	*Lepidium virginicum*
wallflower mustard	*Erysimum cheiranthoides*
water speedwell	*Veronica anagallis-aquatica*
watercress	*Nasturtium officinale*
waterpurslane	*Ludwigia palustris*
wayfaringtree	*Viburnum lantana*
weeping lovegrass	*Eragrostis curvula*
western salsify	*Tragopogon dubius*
white campion	*Silene latifolia*
white clover	*Trifolium repens*
white cockle	*Silene latifolia ssp. alba*
white horehound	*Marrubium vulgare*
white mulberry	*Morus alba*
white mustard	*Sinapis alba*
white poplar	*Populus alba*
white willow	*Salix alba*

Common Name	Scientific Name
wild buckwheat	*Fallopia convolvulus*
wild four-o'clock	*Mirabilis nyctaginea*
wild garlic	*Allium vineale*
wild mustard	*Sinapis arvensis*
wild onion	*Allium canadense*
wild parsnip	*Pastinaca sativa*
wild radish	*Raphanus raphanistrum*
willowleaf lettuce	*Lactuca saligna*
wine raspberry	*Rubus phoenicolasius*
winged burning bush	*Euonymus alatus*
winter creeper	*Euonymus fortunei*
Wisconsin weeping willow	*Salix x penduline*
wisterias	*Wisteria spp.*
woodland strawberry	*Fragaria vesca*
woodland strawberry	*Fragaria vesca ssp. vesca*
yellow alyssum	*Alyssum alyssoides*
yellow bedstraw	*Galium verum*
yellow foxtail	*Setaria pumila*
yellow nutsedge	*Cyperus esculentus*
yellow rocket	*Barbarea vulgaris*
yellow sweet-clover	*Melilotus officinalis*
yellow toadflax	*Linaria vulgaris*
yellow woodsorrel	*Oxalis stricta*

Data taken from EDDMaps status of invasive species report on a county level.
(www.eddmaps.org/)

Essential Fish Habitat

None for WV

Data taken from National Oceanic and Atmospheric Administration (NOAA).
(https://habitat.noaa.gov/appa/efhmapper/?page=page_3)