United States Department of Agriculture

Upper Cheat River Project

Environmental Assessment, Finding of No Significant Impact, and Draft Decision Notice

Forest Service

Monongahela National Forest
Cheat-Potomac Ranger District

8/2/2022

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Cover photo by Nathan Dulaney. View of the project area from Centennial Park overlook on Route 219.

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1. Environmental Assessment

Purpose and Need for the Proposed Action

The Upper Cheat River project area is 86,138 acres and includes 33,991 acres of National Forest System (NFS) lands within the Upper Cheat River watershed, with the remainder privately owned. The majority (99.5%, 33,806 acres) of the project area is located within management prescription (MP) 3.0 of the Forest Plan, which emphasizes age class diversity and sustainable timber production, a variety of forest scenery, habitat for wildlife species tolerant of disturbances, and primarily a motorized recreation environment. The remaining 0.5% of NFS land in the project area is MP 4.1 (Spruce and Spruce-Hardwood Restoration) and MP 6.1 (Wildlife Habitat Emphasis). Due to limited acreage and a lack of need for the types of activities proposed in this project, no activities are proposed in the MP 4.1 and 6.1 areas as a part of the Upper Cheat River project. Several small recreation improvement projects within the project area (Pheasant Mountain trail system and Camp Horseshoe) are being planned. These projects will be analyzed in separate environmental analyses (categorical exclusions), but reasonably foreseeable impacts of these projects will be considered in the analysis of the Upper Cheat River project environmental analysis (and vice versa).

The existing forest communities consist primarily of mixed cove hardwoods (58%) and mixed oak (34%), with northern hardwood, pine-oak, and conifer communities representing the remainder of the project area (Figure 1). Approximately 1% is maintained as open area, which includes two special use permit hay cultivation fields and approximately 200 small wildlife openings distributed across the project area.

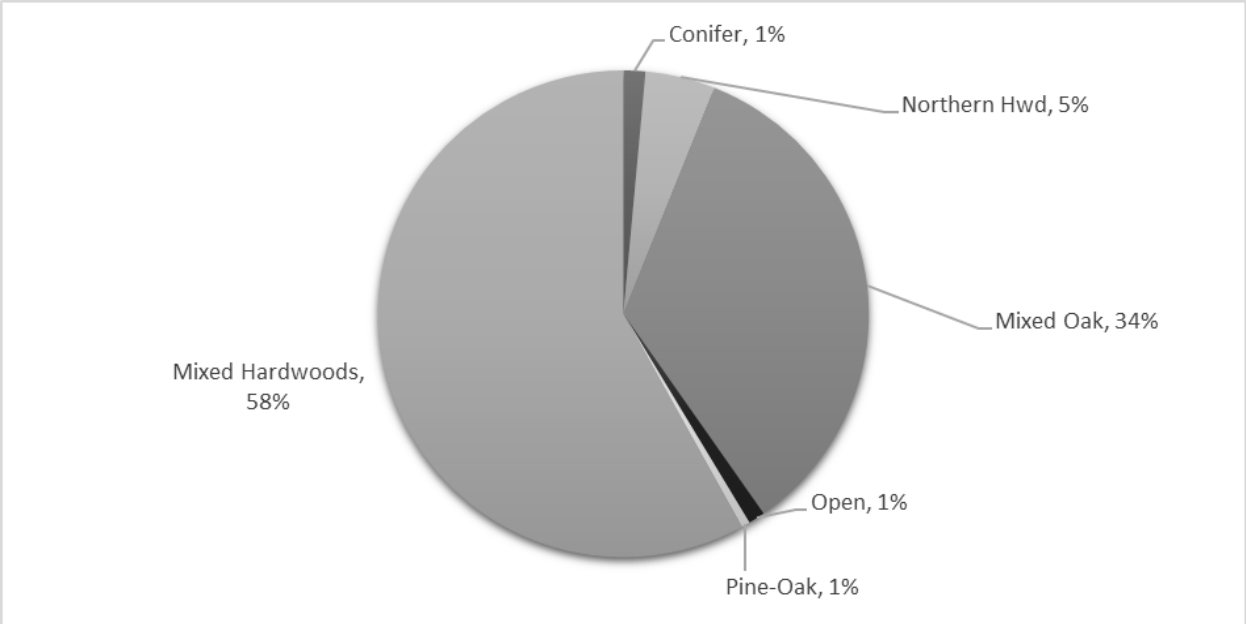

Figure 1. Forest types for NFS land within MP 3.0 of the project area

The majority of the forest (71%) falls into the mid-late successional age class (80-120 years), but early successional forest (0-19 years) is limited and represents only 6% of the project area. Current age class distribution by forest community is shown in Table 1, as well as the desired conditions described in the Forest Plan.

Table 1. Current and Desired Age Class Distribution for NFS land in MP 3.0 in the project area

Forest Community (acres in project area)		Early 0-19 yrs	Early-Mid 20-39 yrs	Mid 40-79 yrs	Mid-Late 80-120 yrs	Late >120 yrs
Conifer	Current	0%	6%	42%	52%	0%
(488 ac)	Desired	10-20%	10-20%	20-40%	20-40%	10-15%
Northern Hardwoods	Current	4%	<1%	<1%	90%	5%
(1,558 ac)	Desired	12-20%	12-20%	24-40%	24-40%	5-10%
Mixed Cove Hardwoods	Current	9%	5%	5%	75%	7%
(19,618 ac)	Desired	12-20%	12-20%	24-40%	24-40%	5-10%
Mixed Oak	Current	3%	5%	2%	62%	28%
(11,583 ac)	Desired	12-22%	12-22%	24-40%	24-40%	5-10%
Pine Oak	Current	11%	12%	77%	0%	0%
(188 ac)	Desired	12-24%	12-24%	24-40%	24-40%	5-10%

Although timber management has occurred over the last two decades through the Lower Clover project (2005 Decision Notice and Finding of No Significant Impact) and the Hogback project (2009 Decision Notice and Finding of No Significant Impact), there still exists a need for action to address the difference between existing and desired age class distribution (Figure 2).

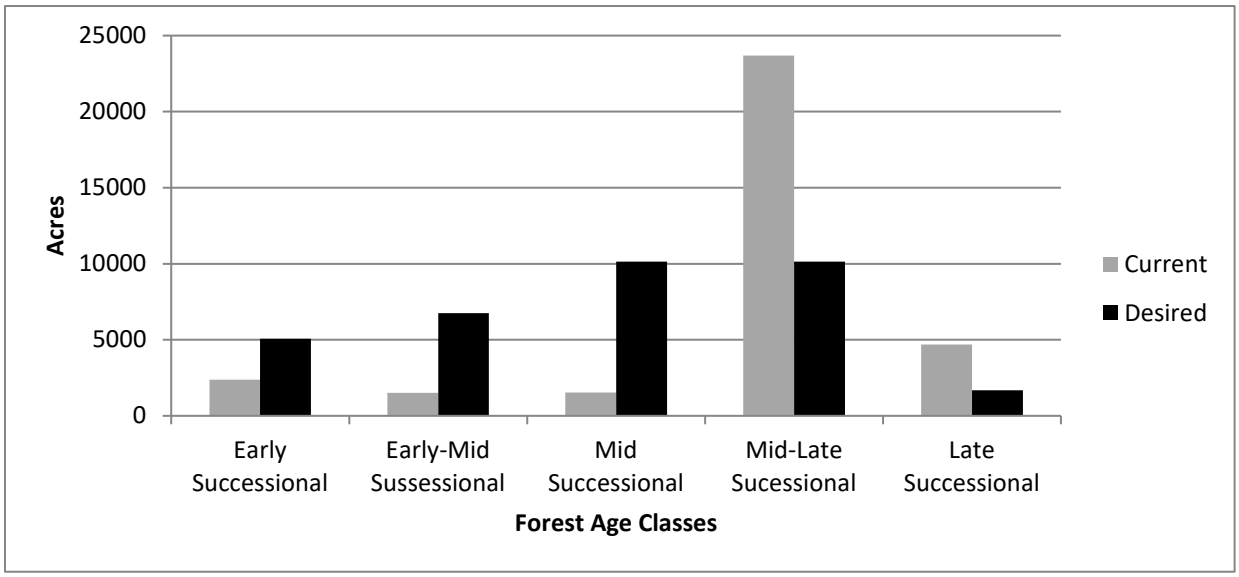

Figure 2. Current and Desired Age Class Distribution for NFS land in MP 3.0 in the project area

The entire project area is impacted by deer browse and approximately 62% of stands have been impacted by beech bark disease. Diseased beech resprout and create an understory of shade tolerant species, such as beech, striped maple, and fern. This has resulted in a lack of tree species diversity and the inability of desirable (wildlife value and/or timber value) shade intolerant species to regenerate.

A lack of species diversity places the forest at risk for future insect and disease outbreaks. Mixed hardwood stands that were regenerated 6-40 years ago are now overstocked with undesirable species.

Exclusion of periodic surface fires from mixed hardwood stands for the past several decades has additionally led to an increase in shade tolerant species in the understory and midstory, which do not provide for future mast production for wildlife.

Approximately 23 miles of open road exists within MP 3.0 of the project area (0.42 miles of road per square mile, including several NFS Roads currently exhibiting resource concerns. Some existing linear features on the landscape exhibit impaired soil quality, productivity, or altered hydrologic flow. This can result in accelerated erosion and in some cases sediment delivery to streams.

Riparian areas are generally forested, with a few areas along Left Fork Clover Run lacking adequate cover for bank protection and stream shading. Several stream reaches lack large woody material and habitat complexity. There are instances of fords needing stabilization or culverts that do not meet the Forest Service Stream Simulation approach, an ecological based approach for designing and constructing road-stream crossings to permit free and unrestricted movement of fish and any other aquatic organisms through the structure.

Desired conditions, goals, and objectives are outlined in the Forest Plan for MP 3.0 (p. III-6), in the Forest Integrated Desired Conditions (p. II-6), and Forest-wide Management Direction by resource area (Chapter II). Desired conditions of MP 3.0 consist of forest stand age classes in the distribution outlined in Table 1, high levels of sustainable timber and mast production, roughly 3-8% of the prescription area unit in maintained or natural openings, and abundant opportunities for motorized recreation (p. III-7). Fire can be used to maintain and restore forest vegetation, wildlife openings, and savannahs (p. II-15). Habitat diversity would support viable populations of wildlife and fish species, including Management Indicator Species (p. II-29) such as brook trout, cerulean warbler, and wild turkey. Forest-wide goals and objectives include restoring the natural structure and function of channel and riparian corridors (p. II-30), as well as maintaining, restoring, or improving soil quality, productivity, and function (p. II-9).

The need for action is determined by the difference between the existing conditions and desired future conditions within the project area. The purpose of this project is to move the project area closer to the desired future conditions of the Forest Plan outlined above. To accomplish this purpose, the Monongahela National Forest has identified a need to:

- Improve age class distribution of forested stands through regeneration using vegetation management.
- Restore, maintain, and enhance wildlife habitat using vegetation management activities and prescribed fire to achieve objectives.
- Promote oak regeneration and increase forest structure and stand resiliency through the application of prescribed fire.
- Provide a network of sustainable roads by addressing resource concerns on existing roads and changing Forest roads designations as needed.
- Improve watershed, riparian, and soil conditions by increasing stream habitat complexity through the addition of wood to streams and floodplains, increase channel stability through planting riparian areas, and stabilizing soils and restoring hydrologic connectivity through soil restoration activities on new and existing features.

Should the Forest take no action to move the forest toward the desired conditions, current conditions and trends would continue. Age class distribution would continue to skew towards older-aged stands. Shade tolerant species would continue to dominate understories and mid-stories. No additional habitat would be created or enhanced. Road designations and public access would remain unchanged. Existing linear features on the landscape would go untreated and streams and riparian areas would remain in their current state. Regular ongoing maintenance would occur on Forest roads, as well as mowing of wildlife openings and cultivation on the hay fields under special use permits. Without proposed actions, the project area is expected to trend towards conditions that do not meet the purpose and need.

Proposed Action

The activities listed in Table 2 and shown on maps beginning on page 82 would advance conditions towards the desired conditions outlined in the Forest Plan. Following the table, each proposed action is described in detail.

Table 2. Summary of the Upper Cheat River project proposed actions

Proposed Action	Extent
Even-aged Hardwood Regeneration	Total: 3,458 acres (Commercial) • 982 acres – Conventional method • 576 acres – Cable yarding method • 1900 acres – Helicopter method
Tree Planting within Regeneration Units	Select locations within 32 units
Thinning	154 acres (Commercial)
Overstory Removal	34 acres (Commercial)
Future Timber Salvage Opportunities	As needed, within commercial units
Pre-and Post-Harvest Herbicide Application	Up to 2,721 acres
Nonnative Invasive Species Prevention	Throughout project area
Timber Landings	Approximately 105 acres • Existing landings – 22 conventional, 33 helicopter • New landings – 16 conventional, 10 helicopter
Skids trails	Approximately 88 acres (49 miles)
Road Reconstruction	1.8 miles
Temporary Road Construction	0.7 miles
System Road Maintenance	45 miles
Timber Stand Improvement	1,060 acres (Non-commercial)
Wildlife Opening Expansion	4 acres
Cutback Borders	8 acres (Non-commercial)
Linear Feature Daylighting	Total: 15 acres (7 acres - Non-commercial; 8 acres - Commercial)
Oak Savannah Creation	25 acres
Prescribed burning	Total: 920 acres in 3 burn blocks with 8,400 feet of control line needed (Clover Run block – 480 acres; Jonathan Run block – 100 acres; Dry Run block – 340 acres)
Proposed Action	**Extent**
Maintenance of Existing Wildlife Openings	321 acres
Existing Forest System Road Status – Change to “Seasonal”	20.4 miles
Existing Forest System Road Status – Change to “Closed” and receive Soil Restoration Activities	2.1 miles
Existing Linear Features – Soil Restoration Activities and Wildlife Habitat Enhancement	90 acres (50 miles)
Large Woody Material Addition	Up to 13.2 miles of stream (using 330 acres for wood source, approximately 1,320 trees)
Riparian Buffer Improvement	7 acres
Aquatic Organism Passage Restoration	15 instances

Even Aged Hardwood Regeneration: Regenerate 3,458 acres of hardwood stands (mostly mid-late successional) using commercial clearcut with reserves or shelterwood methods (Table 3). This would be completed through conventional ground-based skidding operations (982 acres), cable yarding (576 acres), and helicopter harvesting (1900 acres). All vegetation one inch in diameter and greater would be felled, except for reserve trees. Some hardwood stands also include a pine component. In the two shelterwood units, this would occur over two harvests (5-10 years apart) – the first would reduce the relative density of the stand, and the second would remove the remaining overstory after adequate regeneration has established. Most regeneration units would rely on natural regeneration of seedlings, though some could require tree planting to assist regeneration (see tree planting section below). Timber operators would use mechanical equipment to access, manage, and transport forest products. In conventional logging, logs are cut and dragged behind a rubber-tired skidder from the stump to a landing using a system of skid trails within the unit. In cable yarding, cables strung throughout the unit are used to transport logs to a planned skid system within the unit (usually one skid trail located at the top of the unit). In helicopter logging, helicopters fly logs from the stump to a landing using a cable suspended beneath the helicopter. Harvest types were chosen based on landscape position of the unit, economic value of the timber, and road infrastructure. Slash generated from treetops and non-merchantable trees would remain onsite to reduce deer browse of desirable regeneration. Closure orders would be issued to prevent public access to units, roads, trails, and other areas where the safety of individuals or property may be impacted by harvest activities.

Tree Planting: In regeneration units where natural regeneration alone is not expected to meet the silvicultural needs, supplemental tree plantings can help move species composition towards a more resilient future stand. Hand planting of black walnut, oaks, and white pines could occur within any harvest unit and is anticipated in select locations within 32 regeneration units.

Herbicide Application: To encourage successful regrowth following the harvest, up to 2,721 acres could be treated with either pre- and/or post-harvest application (to encourage regeneration of desirable vegetation and control interfering vegetation). Application types would be basal spray, cut surface, foliar spray, and spot foliar using sulfometuron-methyl, imazapyr, triclopyr, and glyphosate. Botany surveys throughout the project area were completed in summer 2021. Documented instances of non-native invasive plant species needing control will be completed by tiering to the 2010 Forest-wide Nonnative Invasive Plant Management Project Environmental Assessment.

Table 3. Details of the proposed regeneration units

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide Anticipated?	Post-Harvest Planting Anticipated?
R1	Clearcut with reserves	Helicopter	80-120	25	No	No
R10	Clearcut with reserves	Helicopter	80-120	28	Yes	No
R100	Clearcut with reserves	Helicopter	80-120	28	Yes	No
R101	Clearcut with reserves	Helicopter	80-120	39	Yes	No
R102	Clearcut with reserves	Helicopter	80-120	34	Yes	No
R103	Clearcut with reserves	Helicopter	80-120	32	Yes	No
R104	Clearcut with reserves	Cable	80-120	38	No	No
R105	Clearcut with reserves	Helicopter	>120	38	Yes	No
R106	Clearcut with reserves	Helicopter	80-120	24	Yes	No

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide Anticipated?	Post-Harvest Planting Anticipated?
R11	Clearcut with reserves	Helicopter	80-120	20[1]	No	No
R110	Clearcut with reserves	Helicopter	80-120	40	Yes	No
R111	Clearcut with reserves	Helicopter	>120	39	Yes	No
R112	Clearcut with reserves	Helicopter	>120	40	No	No
R113	Clearcut with reserves	Helicopter	80-120	40	Yes	No
R114	Clearcut with reserves	Helicopter	80-120	30	Yes	No
R115	Clearcut with reserves	Helicopter	80-120	37	Yes	No
R116	Clearcut with reserves	Helicopter	80-120	24	Yes	No
R117	Clearcut with reserves	Cable	80-120	40	Yes	Yes
R118	Clearcut with reserves	Cable	>120	35	Yes	No
R119	Clearcut with reserves	Helicopter	80-120	33	Yes	No
R12	Clearcut with reserves	Helicopter	80-120	30	Yes	No
R120	Clearcut with reserves	Conventional	>120	25	Yes	No
R125	Clearcut with reserves	Cable	80-120	40	Yes	Yes
R126	Clearcut with reserves	Helicopter	80-120	10	No	No
R127	Clearcut with reserves	Conventional	80-120	9	Yes	Yes
R128	Clearcut with reserves	Conventional	80-120	9	Yes	Yes
R129	Clearcut with reserves	Cable	80-120	36	Yes	No
R13	Clearcut with reserves	Helicopter	80-120	34	Yes	No
R130	Clearcut with reserves	Helicopter	80-120	27	No	No
R131	Clearcut with reserves	Conventional	80-120	20	Yes	No
R132	Clearcut with reserves	Conventional	80-120	29	Yes	No
R133	Clearcut with reserves	Conventional	80-120	22	Yes	No
R135	Clearcut with reserves	Helicopter	80-120	35	Yes	No
R136	Clearcut with reserves	Helicopter	80-120	33	No	No
R138	Clearcut with reserves	Helicopter	80-120	21	Yes	No
R139	Clearcut with reserves	Conventional	>120	22	Yes	No
R14	Clearcut with reserves	Helicopter	80-120	32	No	No
R146	Clearcut with reserves	Conventional	80-120	18	Yes	Yes
R147	Clearcut with reserves	Conventional	80-120	12	Yes	Yes
R15	Clearcut with reserves	Helicopter	80-120	38	Yes	No
R16	Clearcut with reserves	Helicopter	80-120	38	Yes	No

[1] Modification to the proposed action based on information received during a public meeting. Unit R11 acreage was reduced from 25 acres to 20 acres to expand the 100-foot riparian buffer to further exclude a sensitive area of potential slippage. See the Draft Decision Notice (page 68) for additional information.

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide Anticipated?	Post-Harvest Planting Anticipated?
R17	Clearcut with reserves	Conventional	80-120	40	Yes	No
R18	Clearcut with reserves	Conventional	80-120	26	Yes	No
R19	Clearcut with reserves	Conventional	80-120	26	Yes	No
R2	Clearcut with reserves	Helicopter	80-120	39	No	No
R20	Clearcut with reserves	Conventional	80-120	40	Yes	No
R21	Clearcut with reserves	Helicopter	80-120	21	No	No
R22	Clearcut with reserves	Helicopter	>120	29	Yes	No
R23	Clearcut with reserves	Cable	80-120	15	No	No
R24	Clearcut with reserves	Cable	80-120	34	Yes	No
R25	Clearcut with reserves	Cable	80-120	31	Yes	No
R26	Clearcut with reserves	Conventional	>120	32	Yes	No
R27	Clearcut with reserves	Conventional	80-120	28	Yes	No
R28	Clearcut with reserves	Conventional	80-120	22	Yes	No
R29	Clearcut with reserves	Conventional	80-120	38	Yes	Yes
R3	Clearcut with reserves	Helicopter	80-120	26	No	No
R30	Clearcut with reserves	Conventional	80-120	19	Yes	No
R33	Clearcut with reserves	Conventional	80-120	19	Yes	Yes
R34	Clearcut with reserves	Conventional	80-120	27	No	No
R36	Clearcut with reserves	Cable	80-120	12	No	No
R37	Clearcut with reserves	Conventional	80-120	25	Yes	Yes
R38	Clearcut with reserves	Conventional	80-120	25	Yes	Yes
R39	Clearcut with reserves	Helicopter	80-120	35	Yes	Yes
R4	Clearcut with reserves	Helicopter	80-120	29	No	No
R40	Clearcut with reserves	Helicopter	80-120	37	No	No
R41	Clearcut with reserves	Helicopter	80-120	39	Yes	No
R42	Clearcut with reserves	Helicopter	>120	39	Yes	No
R43	Clearcut with reserves	Helicopter	>120	37	Yes	No
R44	Clearcut with reserves	Helicopter	80-120	34	Yes	No
R45	Clearcut with reserves	Helicopter	80-120	35	Yes	No
R46	Clearcut with reserves	Helicopter	80-120	29	Yes	No
R47	Clearcut with reserves	Cable	80-120	40	Yes	No
R48	Clearcut with reserves	Helicopter	80-120	38	No	No
R49	Clearcut with reserves	Helicopter	80-120	27	No	No
R5	Clearcut with reserves	Conventional	80-120	31	Yes	Yes
R50	Clearcut with reserves	Helicopter	80-120	39	Yes	No
R51	Clearcut with reserves	Cable	80-120	38	No	No
R53	Clearcut with reserves	Helicopter	80-120	40	Yes	Yes
R58	Clearcut with reserves	Cable	80-120	16	Yes	No
R59	Clearcut with reserves	Cable	80-120	31	No	No

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide Anticipated?	Post-Harvest Planting Anticipated?
R6	Clearcut with reserves	Conventional	80-120	25	Yes	Yes
R60	Clearcut with reserves	Helicopter	80-120	40	No	No
R61	Clearcut with reserves	Helicopter	80-120	32	No	No
R62	Clearcut with reserves	Helicopter	80-120	17	No	No
R63	Clearcut with reserves	Helicopter	80-120	24	Yes	No
R64	Clearcut with reserves	Conventional	80-120	35	Yes	Yes
R65	Clearcut with reserves	Conventional	80-120	13	Yes	Yes
R66	Clearcut with reserves	Helicopter	80-120	29	Yes	No
R67	Clearcut with reserves	Cable	>120	28	Yes	Yes
R68	Clearcut with reserves	Helicopter	>120	40	Yes	Yes
R69	Clearcut with reserves	Helicopter	>120	39	Yes	No
R7	Clearcut with reserves	Conventional	80-120	27	Yes	No
R70	Clearcut with reserves	Cable	80-120	39	Yes	Yes
R71	Clearcut with reserves	Cable	80-120	39	No	No
R72	Clearcut with reserves	Helicopter	80-120	23	No	No
R73	Clearcut with reserves	Conventional	80-120	31	Yes	Yes
R76	Clearcut with reserves	Conventional	80-120	22	Yes	Yes
R79	Clearcut with reserves	Cable	80-120	25	Yes	No
R8	Clearcut with reserves	Helicopter	80-120	31	Yes	No
R80	Clearcut with reserves	Helicopter	80-120	28	No	No
R81	Clearcut with reserves	Helicopter	>120	40	Yes	No
R83	Clearcut with reserves	Helicopter	80-120	26	Yes	No
R84	Clearcut with reserves	Conventional	80-120	25	Yes	No
R85	Clearcut with reserves	Conventional	80-120	7	Yes	Yes
R86	Clearcut with reserves	Helicopter	80-120	25	No	No
R87	Clearcut with reserves	Helicopter	40-79	33	Yes	No
R88	Clearcut with reserves	Cable	80-120	27	Yes	No
R89	Clearcut with reserves	Helicopter	80-120	27	Yes	No
R9	Clearcut with reserves	Helicopter	80-120	24	Yes	No
R90	Clearcut with reserves	Conventional	80-120	33	Yes	Yes
R91	Clearcut with reserves	Conventional	80-120	20	No	No
R92	Clearcut with reserves	Conventional	80-120	37	Yes	No
R93	Clearcut with reserves	Cable	80-120	12	Yes	No
R109	Clearcut with reserves (pine component)	Conventional	40-79	5	Yes	Yes
R122	Clearcut with reserves (pine component)	Conventional	80-120	18	Yes	Yes
R123	Clearcut with reserves (pine component)	Conventional	>120	17	Yes	Yes
R32	Clearcut with reserves (pine component)	Conventional	80-120	9	Yes	Yes

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide Anticipated?	Post-Harvest Planting Anticipated?
R35	Clearcut with reserves (pine component)	Conventional	80-120	12	Yes	Yes
R52	Clearcut with reserves (pine component)	Conventional	80-120	18	Yes	Yes
R75	Clearcut with reserves (pine component)	Conventional	>120	13	Yes	Yes
R121	Shelterwood	Conventional	80-120	24	Yes	Yes
R31	Shelterwood	Conventional	80-120	27	Yes	Yes

Thinning: Thin 154 acres (Table 4) to remove approximately 1/3 of the basal area (approximately 70-90 square feet desired basal area). High risk, low quality, diseased, or over-mature trees would be removed from overstocked pine plantations to increase the health, development, and growth of the residual trees. In areas with occurrences of cerulean warbler, hardwood thinning would open the canopy and allow for increased complexity in the structure of the forest, making it more attractive to this management indicator species.

Table 4. Details of the proposed thinning units

Unit	Silvicultural Prescription	Harvest Method	Current Age Class (years)	Acres	Pre- or Post-Harvest Herbicide	Post-Harvest Planting
T145	Thinning	Conventional	80-120	16	No	No
T108	Thinning	Conventional	40-79	2	No	No
T133	Thinning	Conventional	80-120	13	No	No
T134	Thinning	Conventional	80-120	18	No	No
T141	Thinning	Conventional	80-120	12	No	No
T55	Thinning	Conventional	40-79	4	No	No
T56	Thinning	Conventional	40-79	5	No	No
T57	Thinning	Conventional	40-79	5	No	No
T76	Thinning	Conventional	80-120	15	No	No
T78	Thinning	Conventional	40-79	5	No	No
T82	Thinning	Conventional	80-120	18	Yes	No
T93	Thinning	Conventional	40-79	4	No	No
T94	Thinning	Conventional	40-79	5	No	No
T95	Thinning	Conventional	40-79	1	No	No
T96	Thinning	Conventional	40-79	9	No	No
T97	Thinning	Conventional	40-79	6	No	No
T98	Thinning	Conventional	40-79	3	No	No
T99	Thinning	Conventional	40-79	13	No	No

Overstory Removal: Perform maintenance of a stand (34 acres) that was harvested in 2003 by commercially harvesting residual stems to create a young even-aged stand and prevent the leave trees from adversely affecting the growth and vigor of the newly established stand (Table 5).

Table 5. Details of the proposed overstory removal unit

Unit	Silvicultural Prescription	Harvest Method	Acres	Pre- or Post-Harvest Herbicide	Post-Harvest Planting
OR54	Overstory Removal	Conventional	34	Yes	No

Future Timber Salvage Opportunities: Allow for timber salvage of both merchantable and non-merchantable stems from catastrophic or isolated events that may happen within areas already analyzed for harvest through this environmental assessment. Salvage timber could result from events such as, but not limited to, harvest of residual material from implemented activities (i.e. thinning, etc.), insect and disease (i.e. emerald ash borer, gypsy moth, etc.), fire, wind, or other natural occurrences. As silvicultural prescriptions are developed for the timber harvest units prior to implementation, the Silviculturist would determine the extent of the unit affected by the above-mentioned events that could be classified as salvage. In addition, silvicultural activities (e.g. supplemental planting) may be needed following salvage activities if determined necessary. If salvage-related activities have not been analyzed through this environmental assessment on the affected area, the proper level of NEPA analysis must be conducted prior to implementation.

Non-native Invasive Species Prevention: Utilize an enhanced set of best management practices (BMPs) to control introduction of non-native invasive plant species during implementation of all proposed activities. This includes using weed-free seed mixtures, restricting the use of hay for mulch, using appropriate cleaning methods for equipment, and requiring all vehicles be cleaned prior to arriving on the Forest

Timber Landings: Approximately 105 acres of landings would be needed to facilitate timber removal by stacking and processing logs and loading them onto trucks. Landings are assumed to be ½ acre for conventional harvest and 2 acres for helicopter harvest. Existing landings (22 conventional, 33 helicopter) would be used where practical; new landings (16 conventional, 10 helicopter) would be created where needed. Following use, landings would be seeded and mulched.

New Skid Trails: Approximately 45.7 miles (82 acres) of skid trails would be created within harvest units to facilitate proposed activities. Another 3.3 miles (6 acres) of skid trails would be created outside of timber units. Skid trails are linear features mechanically created to move logs with a skidder or similar machine from a cut stump to a timber landing. All new skid trails would be treated with USFS and WV best management practices following harvest, as weather and soil conditions allow, to reduce the risk of effects to soil and water quality and hydrologic function. If field observations indicate impaired recovery of hydrologic function, poor soil quality, or are located on slopes greater than 40%, enhanced treatment would be applied on those trails. Enhanced treatments could include surface decompaction by ripping to a minimum of 12 inches or decompacting and recontouring the surface to achieve a minimum of 20 percent outslope. Indicators that would result in the application of these enhanced treatments may include: groundwater interception in the cut slope, rills or surface flow on the trail surface, ponding of water, lack of growing vegetation, or indicators of poor soil quality.

Road Reconstruction, Temporary Road Construction, and System Road Maintenance: Reconstruct 1.8 miles of existing road and construct 0.7 miles of temporary road to facilitate implementation of project activities. Any Forest Service-specified system road used for vehicular travel by registered/licensed vehicles are referred to as “roads”. Reconstructed road would become part of the Forest’s transportation system and would receive regular maintenance in the future. “Temporary roads” are used for vehicular travel by licensed vehicles to haul timber from a landing to a specified road and are rehabilitated following

use. Approximately 45 miles of existing Forest System roads within the project area would receive regular maintenance (drainage work, adding stone, reshaping, etc.) to facilitate project activities.

Timber Stand Improvement: Apply timber stand improvement to 1,060 acres of stands 6-40 years old to release desirable species and control grapevine. Selected crop trees would be released by mechanical methods (chainsaws or girdling) from nearby competing vegetation that touch the crown of the selected trees. Grapevines would be severed to leave a gap to deter sprouting vines from climbing into the crowns. Grape arbors would be retained where possible. In units where grapevine is under the threshold of 20 vines per acre, vines would be retained for wildlife benefit. Work would focus on retaining healthy tree and shrub species most beneficial to wildlife, ensuring cover and food sources remain.

Wildlife Opening Expansion: Expand existing wildlife openings #125 and #131 (4 acres expansion total) where vegetation has encroached. Trees would be removed non-commercially, stumps would be grubbed, and the resulting opening would be prepared by disking, fertilizing, and seeding with a mix of native species beneficial to wildlife. These openings would then be maintained by mowing.

Cutback Borders: Create two noncommercial cutback borders (8 acres total) by feathering the edge of two existing wildlife openings (WLOs # 177 and 142) to improve edge habitat. Timber would be cut or girdled in a 150’ zone surrounding the existing openings.

Linear Feature Daylighting: Feather vegetation in a 50’ zone extending on both sides of the linear feature to improve edge habitat for wildlife species. Timber would be removed noncommercially through chainsaws or girdling along linear wildlife opening #257 (7 acres) and commercially along Forest Road 930C (8 acres).

Oak Savannah Creation: Create a 25-acre oak savannah using conventional, commercial timber harvest. Approximately 40-50 square feet/acre of residual basal area would be retained. This savannah is located within the Clover Run burn block and would be maintained with prescribed fire (described below).

Table 6. Details of the proposed savannah unit

Unit	Silvicultural Prescription	Harvest Method	Acres	Pre- or Post-Harvest Herbicide	Post-Harvest Planting
S144	Savannah	Conventional	25	No	No

Prescribed Burning: Apply low-to-moderate intensity prescribed fire to three burn blocks (Clover Run – 480 acres, Jonathan Run - 100 acres, and Dry Run - 340 acres) to maintain wildlife openings and oak savannahs, promote oak regeneration, and enhance wildlife habitat. These burn blocks contain existing wildlife openings, a proposed savannah, proposed thinning units, a regeneration unit, and recently thinned timber stands. The timing and duration of the prescribed burns is based on fuel conditions. Burns would occur in spring and/or fall and include broadcast and pile burning to reduce surface fuels. Subsequent maintenance would be implemented on a 2 to 5-year rotation with timing based on fuel loading and resource objectives. Roads, trails, ridgelines, and natural features would be used for prescribed burn control lines (to stop the spread of fire) where practical, which would reduce the need for mechanical disturbance to the forest floor. Where natural features are not present, approximately 8,400 feet of fire control lines would be created using chainsaws and leaf blowers. Ignition may be accomplished by ground or aerial methods.

Maintenance of Existing Wildlife Openings: Existing wildlife openings (321 acres) were assessed for need in coordination with the WV Division of Natural Resources, who assists with opening maintenance. Existing openings that have begun ecological succession towards a forested community due to access issues and/or remote locations would no longer be maintained as wildlife openings. All other existing wildlife openings could receive regular maintenance through mowing. Additional proposed maintenance beyond mowing is listed in Table 7.

Table 7. Existing Wildlife Opening Maintenance

Wildlife Opening Number	Total Acres	Maintenance Action Needed
012, 013, 018, 019, 021, 030, 040, 045, 046, 050, 051, 052, 053, 054, 055, 056, 057, 058, 063, 065, 066, 070, 071, 076, 079, 080, 081, 083, 085, 086, 087, 088, 089, 092, 094, 100, 105, 107, 110, 117, 119, 134, 136, 137, 138, 139, 152, 155, 161, 162, 163, 178, 250	22.0	No longer would be maintained as an opening
028, 047, 048, 049, 059, 062, 067, 068, 069, 072, 073, 074, 075, 078, 084, 093, 095, 096, 097, 098, 101, 102, 104, 106, 108, 113, 122, 123, 124, 126, 132, 133, 135, 140, 142, 147, 148, 149, 150, 151, 153, 154, 156, 157, 158, 159, 164, 165, 166, 170, 181, 217,0219, 220, 221, 222, 223b, 224, 225, 226, 227, 228, 229, 230, 232a, 237, 238, 239, 240, 241, 242, 243, 245, 246, 247, 248, 249, 251, 252, 253, 254, 255, 256, 257, 258, 259, 261, 262	205.2	Mow Only
223a	3.2	Cut aspen, plant native species
015, 016, 025, 026, 027,146	9.0	Disking, plant native species
017, 022, 060, 061, 064, 099, 103, 109, 115, 131, 141, 160, 168, 169, 177, 180	16.7	Herbicide to remove undesirable species, disking, plant native species
020	5.7	Herbicide to remove undesirable species, disking, plant native species, prescribed fire
179	1.4	Herbicide to remove undesirable species, disking, plant native species, repair water hole
116, 125, 144, 145, 167, 182, 183, 214, 218, 244	22.2	Mulching
091, 111, 118, 121	11.6	Mulching, disking, plant native species
215, 216	3.9	Mulching, prescribed fire
029, 031, 032, 034, 036, 038, 042, 044, 077, 143, 232b	7.3	Plant native wildlife shrubs and trees
082, 172, 173, 175, 176	12.6	Prescribed fire

Soil Restoration Activities and Status Changes on Forest System Roads: Existing forest system roads in the project area were assessed for resource and management objectives (i.e. use in implementation of project activities, use for recreational hunting in controlling deer browse, or the need to address existing resource damage). Roads proposed to be opened seasonally for public access are listed in Table 8. Roads requiring soil restoration activities to address resource concerns would be closed to the public and are listed in Table 9.

Table 8. Forest roads proposed to be open seasonally.

Forest Road Number	Miles	Proposed Status
767A	1.8	Open seasonally for recreational hunting to control deer browse. Roads would remain open for 3-5 years following timber harvests, or as resource objectives are met, to control deer browse in regeneration units. Annual updates for status change would be shown on the Forest Motor Vehicle Use Map.
869	1.2	
929, 929A, 929B, 929C, 929D	5.8	
930, 930A, 930B, 930BA	7.2	
935	1.6	
937	2.8	
TOTAL	**20.4**	

Table 9. Forest roads proposed for soil restoration activities and closure.

Forest Road Number	Proposed Soil Restoration Activities	Miles	Proposed Status
959	Decompact and recontour. Restore stream crossings.	0.7	Closed to the public, decommissioned
968	Restore and stabilize road for special use permit access. Divert stream from the road surface and harden stream crossings. A gate would be installed at the county road.	0.2	Closed to the public, maintained in a storage state
767	Stabilize the first 0.3 miles and decompact and recontour the last 0.2 miles.	0.5	Closed to the public
122	Stabilize the first 0.2 miles and decompact and recontour the last 0.2 miles, blocking vehicular access at the turnaround. Restore multiple channel crossings.	0.4	Closed to the public, decommissioned beyond blockade.
137	Restore and stabilize road. Remove culverts.	0.3	Closed to the public, maintained in a storage state
TOTAL		**2.1**	

Soil Restoration Activities & Wildlife Habitat Enhancement on Existing Linear Features: Apply up to 90 acres (50 miles) of soil restoration activities to existing linear features on the landscape to improve soil and water quality, vegetative vigor, and create wildlife water sources. These features are primarily in areas with soil sensitivities or on steeper slopes that show evidence of ground water interception, surface flow concentration, or soil erosion. Spot treatments on linear features with less soil and water resource degradation would include localized outsloping, restoring channels, and/or removing remnant structures (e.g. culverts). Decompaction and recontouring to natural slope contours would occur on linear features with excessive soil movement, erosion, groundwater interception, or other substantial impairments. In determining the treatment type for each feature, public use and the future need for land management was considered. On all treated surfaces, wildlife water sources may be created where soil and hydrologic conditions are amenable.

Large Woody Material Addition: Add wood in streams lacking habitat complexity by directionally felling nearby trees into the channel or transporting and placing large wood into the channel. This may be accomplished using grip-hoist/rigging and chainsaws on up to 13.2 miles of stream in Clover Run, Horseshoe Run, Indian Run, Left Fork Clover Run, Right Fork Clover Run and an unnamed tributary, Mill Run, and Tanner Run. Approximately 330 acres of forest would be used to source wood, which would total approximately 1,320 trees. Heavy machinery may be used to place wood in Clover Run, Left Fork Clover Run, Right Fork Clover Run, and Horseshoe Run.

Riparian Buffer Improvement: Improve 7 acres of riparian buffer on the Left Fork Clover Run. The buffers on two special use permit cultivation fields (1.5 and 1.3 acres) would be expanded to increase floodplain function and improve stream shading by planting native trees and shrubs. An abandoned wildlife opening in the riparian area (1.3 acres) on Left Fork Clover Run would also be planted. A disturbed riparian area with unauthorized off-road vehicle use and dispersed camping on Left Fork Clover Run (2.9 acres) would receive soil restoration through spot decompaction, native plantings, and blocking the area from vehicular use. In addition, another 6.1 acres of existing riparian wildlife openings will be

planted with native wildlife shrubs and trees (acreage is included in the “Maintenance of Existing Wildlife Openings” section).

Aquatic Organism Passage (AOP) Restoration: Improve 15 culverts or fords at road/stream intersections that do not meet the Forest Service Stream Simulation approach or are causing sedimentation issues. Activities could include stabilization, repair, replacement, or removal.

Design Elements

The design features listed in Table 10 would be incorporated into the proposed action to ensure land management plan compliance:

Table 10. Design features included in the Proposed Action

Design Feature Label	Design Feature Description	Forest Plan Component
Heritage-1	For all ground disturbing activities, if tree felling occurs adjacent to a heritage resource, directional fell trees away from the site be implemented, or a buffer comprising the height of the nearest possible fell, plus one-half, would be established. These buffers shall be incorporated into the field marking of sites. All historic properties identified as having potential direct effects from project activities should be marked and avoided during all phases of project implementation.	HR04, HR05
Heritage-2	During all ground disturbing activities, should the unanticipated discovery of previously unidentified historic properties occur, the Heritage Program Manager shall be notified and activity in that area cease until the size and nature of the resource can be determined in consultation with the West Virginia Division of Culture and History and sovereign tribal partners of the Monongahela National Forest.	HR04, HR05
SoilWater-1	If crossing of seeps and areas of wet soils in Units R64, R75, R76, R84, and R85 is unavoidable during skid trail layout, pre-advertisement coordination would occur between timber, soil, and hydrology specialists to minimize disturbance by using wooden mats or corduroy, or a combination.	SW04, SW51
SoilWater-2	In harvest units R52, OR54, R64, R75, R76, T76, R92, R131, and R132, which exhibit landform conditions prone to concentrating storm flow, pre-advertisement coordination would occur between timber, soil, and hydrology specialists during skid trail layout to minimize disturbance using protective measures, such as wooden mats, corduroy, slash, etc.	SW04, SW17, SW19
SoilWater-3[2]	In regeneration unit R35 and thinning unit T141, use only existing legacy features as skid trails to harvest timber. In regeneration unit R65, avoid skid trail construction on slopes >40%. In thinning Unit T145, avoid skid trail construction on slopes >50%.	SW04, SW07, SW17, SW19

[2] Modification to the proposed action based on information received from a commenter during the 30-day comment period. Design Feature SoilWater-3 was modified to include measures to ensure compliance with Forest Plan Standard SW07in Units R35, R65, and T145. See Decision Notice (page 68) for additional information.

Design Feature Label	Design Feature Description	Forest Plan Component
SoilWater-4	Use of existing landings located within stream buffers or wet areas (#34, #39, #56) would incorporate redundant erosion control measures in any potential storm flow paths towards streams or road ditches. When shaping the landings, ensure flow is directed away from flow paths. Use existing footprints if possible, but should the footprint require expansion, expand the landing in the direction furthest from the stream. Following use, landing #56 would be maintained as a trailhead to Clover Trail by providing adequate drainage away from flow paths and a stable stone surface.	SW40, SW51
Botany-1	Botany surveys identified four occurrences of sensitive species in or near proposed activity areas which would require protective measures to avoid or minimize negative effects to these occurrences. This includes one Roan Mountain sedge in harvest unit R52 which would be buffered or transplanted, two butternuts in the Dry Run and Jonathan burn blocks which would be cleared of surrounding fuels prior to the burns, and one Appalachian blue violet near the large woody additions to Tanner Run which would be buffered.	VE13
Wildlife-1	Tree cutting must occur from August 1 to May 31 in the non-commercial cutback border around wildlife opening 142 to protect Northern long-eared bat maternity roost trees during pup season.	Eastern Region 2015 Programmatic Biological Assessment for the Northern long-eared bat

Environmental Impacts

This section summarizes the analysis and disclosure of effects of the proposed action and alternatives (if included) conducted to support the Finding of No Significant Impact and compliance with applicable law, regulation, and policy.

The analysis for this project was conducted using relevant factors, including site specific data and available scientific information. Based on a review of the record, our staff has thoroughly researched the relevant scientific information, considered responsible opposing views, and acknowledged incomplete or unavailable information, scientific uncertainty, and risk. Please refer to the specialist report analysis in the project record for specific discussions of the science and methods used for analysis and for literature reviewed and referenced.

National Forest Management Act (NFMA) - Land Management Plan Consistency

Pertinent specialists have reviewed the proposal and specific design elements or mitigation measures listed under the "Proposed Action" section and made the following determinations regarding proposal consistency with applicable Forest Plan direction, standards, and guidelines. Because the proposed action is fully consistent with the Forest Plan, there is no need for a plan amendment.

All specialists' reports include statements of consistency and are summarized in Table 11.

Table 11. Summary of Forest Plan consistency

Air Quality: Consistent	**Recreation/Scenery Management:** Consistent
Botany/Ecology: Consistent	**Soil Resources:** Consistent
Geology/Minerals: Consistent	**Vegetation/Timber:** Consistent
Heritage Resources: Consistent	**Water Resources/Fisheries:** Consistent
Lands/Special Uses: Consistent	**Wildlife:** Consistent

Table 12. Applicable project file documentation to support NFMA compliance

Supporting Documentation	File Name(s)
Applicable Forest Plan Standards and Guidelines	UCR- Applicable Forest Plan Standards and Guidelines_508

Other Law, Regulation and Policy Consistency

The following laws, regulations, or policies pertinent to this project include:

Clean Air Act

The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ground-level ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter (PM2.5 and PM10), and lead. NAAQS are threshold concentrations set at conservative levels with the intent of protecting even the most sensitive members of the public. When measured concentrations of any of these pollutants consistently exceed the NAAQS, EPA designates the area as a "non-attainment" area. The project area is not located within or near a non-attainment area (https://www.epa.gov/green-book). Therefore, the proposed actions are evaluated below to ensure the project area will remain in attainment of the NAAQS.

The criteria pollutants of most concern to the project's proposed prescribed burning are fine particulate matter and ozone. Fine particulate matter (PM2.5) is the leading cause of regional haze, also known as visibility impairment. Visibility impairment caused by the proposed prescribed burns is likely to be short in duration (less than 24 hours) and reductions in visibility (distance, color and texture) with distance from the burn. Ozone can harm sensitive forest vegetation. Both fine particulate matter and ozone can impair public health at elevated concentrations.

Prescribed burn emissions would have a short-term effect on air quality in the project area. The majority of smoke disperses within 24 hours, though the amount of smoke and its dispersal depends on burn size, fuel type, and meteorological conditions. Most emissions are "lifted" by heat convection into the atmosphere where they are dissipated by horizontal and downward dispersion from the fire. Effects of this "lifted" smoke can be experienced at greater distances from the burn. The remainder of the emissions do not have enough heat to rise into the atmosphere and remain in intermittent contact with the ground. Turbulent surface winds move this ground level smoke erratically and can deposit smoke particles on vegetation, soil, and other objects. Human exposure to ground level smoke can be more intense, but is relatively brief (hours) and limited to a smaller geographic area than exposure from smoke aloft, which can disperse before returning to the human environment. Fine particulates found in smoke can affect human health, including effects to the respiratory system and eye irritation. Individuals with cardiopulmonary diseases are especially susceptible (Hardy et al., 2001). Residents near the burn unit might have some respiratory discomfort from ground level smoke, however, it is expected that most impacts would be in the form of nuisance smoke and/or smell. These impacts can be minimized by implementing the burn under weather conditions conducive to dilution and dispersion.

Visibility on roads can be reduced by ground level smoke, causing a safety issue. This can be particularly bad if smoke continues into the night when emissions disperse more slowly, become trapped near the ground, or collect in low lying areas. In a humid atmosphere the fine particles along with the water vapor released from the fuels can be a primary contributor to the formation of fog, which can become very dense. Forest Service prescribed burns follow a prescribed burning plan, which ensures conditions are most favorable to meet objectives, maximize smoke dispersion, and minimize the likelihood of escape.

Prescribed burning regularly occurs on the Monongahela National Forest. In order to estimate the effects of prescribed burning on air quality, data can be analyzed to determine if the NAAQS were exceeded. The ozone NAAQS is set at 0.070 ppm over an 8 hour period. The 24-hour fine particulate matter (PM2.5) NAAQS is currently set at 35 µg/m3, while the annual PM2.5 NAAQS is set at 12 µg/m3 (https://www.epa.gov/criteria-air-pollutants/naaqs-table). These metrics are called design values, which are statistics that describes the air quality status of a given location relative to the level of the NAAQS (https://www.epa.gov/air-trends/air-quality-design-values). Each pollutant is measured differently. For ozone, the design value is the annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. For annual PM2.5, the design value is the annual mean, averaged over 3 years while for 24-hours, it is the 98th percentile, averaged over 3 years.

Given that smoke dispersion is highly dependent on local meteorology, it is important to evaluate upwind and downwind data. The closest upwind ozone monitor to the proposed burn blocks is located in Tucker County, WV, while the closest downwind monitor is in Rockingham County, VA. Monitoring data from the past several years indicate that Tucker and Rockingham counties have not exceeded the 8-hour ozone standards (0.070 ppm over an 8 hour period) (https://www.epa.gov/criteria-air-pollutants/naaqs-table). The most recent 8-hour ozone design value was 0.058 ppm (upwind) and 0.053 ppm (downwind) (http://www.epa.gov/airdata accessed on 11/16/2021). The closest upwind PM2.5 monitor is located in Harrison County, WV, and the closest downwind monitor is located in Rockingham County, VA. These monitors can be used to determine if the 24-hour PM2.5 standards (35 µg/m3) or the annual PM2.5 standards (12 µg/m3) were exceeded during previous prescribed burns (https://www.epa.gov/criteria-air-pollutants/naaqs-table). The most recent 24-hour PM2.5 design values were 13.4 µg/m3 (upwind) and 14 µg/m3 (downwind) and annual PM2.5 design values were 6.6 µg/m3 (upwind) and 6.1 µg/m3 (downwind) (http://www.epa.gov/airdata accessed on 11/16/2021).

Furthermore, using 2017 National Emissions Inventory data (NEI), the total PM2.5 emissions in Tucker County, WV was 257 tons. Prescribed fire contributed 58 tons to the total, or 23%. Since 2018, the Monongahela has averaged over 6,500 acres of burning each year. Given that the proposed 920 acres is much less than the average and spread between three units, we do not expect the NAAQS or visibility rules to be violated.

Similarly, the proposed timber harvest is consistent with previous years of harvest on the forest. The project proposes 982 acres of harvest using conventional methods, 576 acres with cable yarding, and 1905 acres with helicopters. Over the last 12 years, the Forest has harvested 2,647 acres conventionally, 113 acres with cable yarding, and 3,226 acres with helicopters. While the proposed action would result in an increase in timber harvested over the project area, impacts to air quality are expected to be short term. During previous harvests, neither NAAQS nor visibility rules have been violated. Given the amount of harvesting that has occurred previously, in addition to the timeline of the proposed action (10 years), it is not anticipated that emissions associated with timber harvest during this project will result in a violation of the NAAQS or visibility rules in the future.

In summary, air quality within the project area and the Monongahela National Forest as a whole currently meets the NAAQS for ozone and fine particulates. Current sources of pollution, including intermittent emissions from ongoing Monongahela National Forest prescribed burns, are not causing air quality to exceed the NAAQS thresholds. This project proposes three prescribed burn blocks (920 acres total), which would impact air quality in and immediately adjacent to the burn blocks for several days following each burn. The additional effects of the proposed prescribed burns are not expected to contribute to an exceedance of the NAAQS.

Table 13. Applicable project file documentation to support Clean Air Act compliance

Supporting Documentation	File Name(s)
Air Quality Specialist Report	SpecialistAnalysisOutlineTool_Air

Clean Water Act

Provides for the regulation of pollutant discharge into the waters of the United States and water quality standards for surface waters. The proposed action is expected to be implemented in consistency with the Act. Incorporated design features, mitigations, and use of WV and USFS BMPs are expected to prevent the discharge of pollutants into waters of the US.

Table 14. Applicable project file documentation to support Clean Water Act compliance

Supporting Documentation	File Name(s)
Hydrology and Aquatics Specialist Report	UCR_SpecialistAnalysis_Watershed_12112021

Endangered Species Act - Threatened, Endangered, Proposed and Candidate Species and Critical Habitat

A formal biological assessment was submitted to comply with Section 7 of the Endangered Species Act on February 23, 2022. A summary of the determinations and rationale is provided below for plant (Table 15) and terrestrial wildlife species (Table 16). There are no federally-listed aquatic species in the project area or designated critical habitats.

Plant surveys were conducted in summer 2021 in areas of proposed major ground disturbance and/or overstory removal in mature stands, and areas proposed for riparian planting and stream enhancements. This mileage included surveys on linear features (e.g. roads) and a minimum of 100 feet of meandering survey per acre of polygon features (e.g. timber units). No occurrences of small whorled pogonia were discovered.

Mist net surveys for federally-listed bats have been completed in the project area from 1997 to 2019. A total of 578 Northern long-eared bats (NLEB) have been documented within the Action Area with 555 occurring within the Project Area. Since the onset of white-nose syndrome (WNS), 95 NLEB have been documented in the Action Area from 2012 – 2019. This included 51 pregnant or lactating females, 38 non-reproductive males, and 6 non-reproductive females. One maternity roost is known to occur within 150' of the cutback border around wildlife opening 142. Additionally, during acoustic surveys in 2020 a total of 107 Northern long-eared bat probable presence calls at 20 survey area locations were recorded. No Virginia big-eared or Indiana bats were detected during mist net surveys. Acoustic surveys conducted during the summer of 2020 within the project area recorded 32 potential Virginia big eared bat calls. A total of 107 Northern long-eared bat probable presence calls at 20 survey area locations were recorded. Likewise, probable presence of Indiana bat was recorded at one location.

Table 15. Threatened, endangered, proposed or candidate species and critical habitat effect determinations

Species	Status	Determination	Brief Rationale
Small whorled pogonia	Threatened	NLAA	This species occurs in second or third-growth successional stages of mixed-deciduous or mixed deciduous/coniferous forests with a relatively open understory. Although potential habitat exists, historical and recent surveys within the project area that may receive ground disturbance did not detect presence. Due to low detection probability for this species, there could be undetected occurrences within the project area, but overall negative effects to SWP are considered discountable.
Virginia spirea	Threatened	NE	There are no damp, rocky banks of larger, high gradient streams in the project area. Therefore, there is no potential habitat within the project area.
Shale barren rockcress	Endangered	NE	There are no shale barrens in the project area. Therefore, there is no potential habitat within the project area.

NE – no effect; **NLAA** – may affect, not likely to adversely affect; **LAA** – may affect, likely to adversely affect; **No Jeopardy** - not likely to jeopardize the continued existence or adversely modify critical habitat

Based on no historical or recent occurrences of small whorled pogonia, the low likelihood of negative effects at the population level, and because un-surveyed proposed activities are unlikely to have adverse effects to the species, the potential for direct and indirect effects to small whorled pogonia from proposed activities is considered discountable (USFWS 2006 p. 93). In addition to cumulative effects addressed in the Biological Assessment for Section 7 consultation for the Endangered Species Act, approximately 2,206 acres of timber harvest has occurred on NFS land within the project area as part of the Lower Clover EA, the Hogback EA, and Corridor H construction over the past 15 years. The 291 acres harvested for the construction of Corridor H highway construction are irretrievable acreage that accounts for less than one percent of the NFS lands in the project area. The 1,915 acres harvested in the Lower Clover and Hogback projects would continue to age into stands that could become suitable habitat for small whorled pogonia, approximately 20 years following harvest when the stem density drops below 750 stems per hectare (Mehrhoff 1989). The proposed action would be unlikely to make any measurable contribution to the effects that are reasonably foreseeable or have a close causal relationship to the proposed action. The proposed action "may affect but is not likely to adversely affect" small whorled pogonia.

Table 16. Threatened and endangered terrestrial wildlife species effect determinations

Species	Status	Determination	Brief Rationale
Cheat Mountain salamander	Threatened	NE	CMS habitat was evaluated through mapping exercises and habitat assessments by a trained USFS Wildlife Biologist. Habitat models identified approximately 11 acres within 2 timber harvest units as potential habitat. Site specific habitat data were collected and evaluated to determine if key habitat characteristics are present. It was determined that no suitable habitat occurs within these 11 acres. Therefore, the proposed action would have “No Effect” and no further consultation is required.
Rusty patched bumble bee	Endangered	NE	Portions of the Upper Cheat River project area are within rusty patched bumble bee low potential zones, which include primary dispersal and uncertain zones. USFWS guidance for projects in low potential zones does not require surveys and does not require Section 7 consultation. Therefore, the proposed action would have “No Effect”, and no further consultation is required.
Virginia big-eared bat	Endangered	NLAA	Tree removal activities would have no direct effect to Virginia big-eared bat (VBEB) as they do not use trees for daytime roosting, but instead return to maternity/bachelor cave locations during daylight hours. Vegetation management is not proposed within 200 feet of occupied caves; therefore, the potential to disturb roosting bats is discountable. VBEB prefer to forage in open, uncluttered environments, such as forest edge ecotones, open pastures, agricultural fields, above tree crowns, and along cliff faces. Proposed harvest areas may create additional suitable foraging habitat for VBEB. Because VBEB’s return to cave environments during the daytime hours, timber stand improvement (TSI) activities would not affect VBEB roosting. TSI activities could indirectly benefit VBEB by improving foraging habitat by opening the canopy, which may increase prey base and promote edge habitat. Prescribed burning in the Clover Run burn unit would be used to create and maintain a mosaic of open and forested habitat within a 6 mile foraging area. These activities would be beneficial to VBEB. Benefits to foraging habitat would occur with enhancement of riparian areas and wildlife openings. Expanding wildlife openings would create additional foraging habitat. Herbicide treatments are not expected to directly affect the VBEB as the treatments target specific understory and herbaceous layer species.

Species	Status	Determination	Brief Rationale
Northern long-eared bats	Threatened	LAA	A project specific design feature was incorporated to avoid any prohibited incidental take to NLEB. Tree cutting in the non-commercial cutback border around wildlife opening 142 must occur from August 1 to May 31 to protect the known Northern long-eared bat maternity roost tree located within 150' of the cutback border. Impacts are likely to occur as a result of harvesting trees > 5 inch dbh. These impacts are associated with 3,795 acres of vegetation management and associated activities, 920 acres of prescribed burning, and 6 acres of road construction and/or reconstruction. Riparian plantings are expected to have long-term beneficial effects on the suitability of foraging habitat along the riparian corridors, as the purpose of the plantings is to increase shade and cover to portions of the stream that currently have reduced cover and improve the overall health of aquatic ecosystems. Herbicides have known impacts on Lepidoptera larvae and other insects, which are primary food sources. However, based on the scope and scale of these activities these impacts are minimal within the Action Area. Therefore, proposed activities in the Upper Cheat River project may affect the NLEB but will not cause prohibited take as described in the Final 4(d) Rule, and the voluntary framework identified in the USFWS range-wide BO (USFWS 2015b)
Indiana bat	Endangered	LAA	Impacts are likely to occur as a result of harvesting trees > 5 inch dbh. These impacts are associated with 3,795 acres of timber harvest and associated activities, 920 acres of prescribed burning, and 6 acres of road construction and/or reconstruction. Riparian plantings are expected to have long-term beneficial effects on the suitability of Indiana bat foraging habitat along the riparian corridors, as the purpose of the plantings is to increase shade and cover to portions of the stream that currently have reduced cover and improve the overall health of aquatic ecosystems. Herbicides have known impacts on Lepidoptera larvae and other insects, the primary food source for Indiana bat. However, based on the scope and scale of these activities these impacts are minimal within the Action Area. These impacts were previously assessed in the 2006 Forest Plan Programmatic Biological Assessment (PBA), Programmatic Biological Opinion (PBO) and subsequent amendments.

NE – no effect; **NLAA** – may affect, not likely to adversely affect; **LAA** – may affect, likely to adversely affect; **No Jeopardy** - not likely to jeopardize the continued existence or adversely modify critical habitat

In addition to cumulative effects considered in the Biological Assessment for Section 7 consultation for the Endangered Species Act, approximately 2,206 acres of timber harvest has occurred on NFS land within the project area as part of the Lower Clover EA, the Hogback EA, and Corridor H construction over the past 15 years. The 291 acres harvested for the construction of Corridor H highway are irretrievable acreage. There would be a total loss of habitat of less than one percent of available bat habitat in the project area on National Forest System (NFS) lands. The 1,915 acres of timber harvest in the Lower Clover and Hogback projects have already begun to revegetate. Over the short-term (approximately 10 years), disturbance associated with these activities would reduce federally-listed bat habitat. Although the reduction in forested habitat is measured as a loss of area with potential roost trees (sheltering habitat), the reduction in forested habitat would also increase habitat complexity, thereby improving potential foraging habitat for federally-listed bats. NFS lands are managed to primarily maintain healthy forested habitats. As these areas revegetate, roosting habitat would become available in the future (about 40 years following harvest). These impacts from past federal actions and this project's proposed action

would occur on approximately 17% of the National Forest System lands within the project area. These effects are similar to those analyzed in the 2006 Forest Plan PBA/PBO/subsequent amendments and the range-wide BO for Northern long-eared bats. As a result, implementation of this project in addition to effects that are reasonably foreseeable or have a close causal relationship to the proposed action is not expected to have a significant effect to any federally-listed bat species

Table 17. Applicable project file documentation to support Endangered Species Act compliance

Supporting Documentation	File Name(s)
Biological Assessment	UCR_BA_02192022
Wildlife specialist report	UCR_SpecReport_Wildlife_Final_ 02232022
Botany specialist report	UCR_BotanyEcologySpecialReport_20211227
Occurrence Analysis Results (Likelihood of Occurrence)	TES_OAR_Masterlist_508checked

Sensitive Species (Forest Service Manual 2670)

Aquatic Species

Of the 15 aquatic RFSS species, five have potential habitat within the project area (Table 18). The two primary risks to aquatic RFSS associated with the proposed action are changes to water temperature and sedimentation, which can be generalized for all RFSS and the Forest's Management Indicator Species (MIS), brook trout, because they share the same environment and are largely subject to changes in these conditions homogeneously. Generally, the species most sensitive to an environmental stressor is used as a surrogate for the aquatic community. This analysis relied on brook trout as a more sensitive indicator of watershed effects, which are discussed in the "Additional Effects Analysis" section of this document. Brook trout are found further upstream in headwater streams (e.g., 1st and 2nd order streams) and closer to proposed actions; therefore, potential risk to aquatic RFSS occurring downstream (e.g., 3rd order and higher streams) is expected to be less than for brook trout. Aquatic RFSS are less sensitive to water temperature stress and are equal or less sensitive to sedimentation than brook trout; therefore, for all aquatic RFSS the proposed action may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability.

Table 18. Aquatic sensitive species impact determinations

Species	Determination*	Rationale (or refer to project documentation)
Eastern hellbender	MIIH	Documented in the analysis area. Known to occur in the Cheat River and Horseshoe Run. May occur in other larger streams in the analysis area; however eDNA surveys in 2020 in Clover Run failed to detect presence.
Allegheny pearl dace	MIIH	Historical records indicate occurrence in Clover Run, Left Fork Clover Run, and Horseshoe Run. Has not been documented in AEUI surveys at eight sites (2006-2020).
Cheat minnow	MIIH	Historical records indicate occurrence in Minear Run and Horseshoe Run. Has not been documented in AEUI surveys at eight sites (2006-2020).
Rapids clubtail	MIIH	No records within analysis area, but suitable habitat exists.
Green-faced clubtail	MIIH	No records within analysis area, but suitable habitat exists.

NI – no impact; **MIIH**- may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species; **WIFV** - will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species

Plant Species

Of the 71 RFSS plant species known or expected to occur on the Monongahela National Forest, 36 species were eliminated because the project area is outside of known species range or lacks suitable habitat. For all species with potential habitat in the project area, it is assumed that the lack of occurrences would suggest that even if there were undetected occurrences of any of these species in the areas proposed for management, they are not at a level high enough that negative impacts could cause of a loss of viability for any of these species at the Forest level. The remaining 35 species are addressed in Table 19.

Table 19. Plant sensitive species impact determinations

Species	Determination*	Rationale (or refer to project documentation)
Allegheny onion, western blue virgins bower, Bentley's coralroot, roundleaf dogwood, showy lady's slipper, tall larkspur, Appalachian oak fern, Blue Ridge St. John's wort, thread rush, Monongahela Barbara's-buttons, Limestone Adder's-tongue, swamp lousewort, Shriver's purple fringed orchid, bog bluegrass, Tennessee pondweed, Beadle's mountain mint, Pennsylvania buttercup, smooth rose, rock skullcap, hyssop leaf hedgenettle, boreal starwort, Canada Yew, sticky tofieldia, three birds orchid, American cranberrybush, sand grape, and netted chainfern	MIIH	These 27 species have potential habitat in the project area but were not documented in surveys. The probability of occurrence in areas that would be affected by project activities is low; therefore, the effects determination for these species is 'may impact individuals but would not lead to a loss of viability or trend toward federal listing'
Lanceleaf grapefern, false Indian plantain, white alumroot, and mountain pimpernel	MIIH	These four species have historically been documented in the project area but were not detected in or near areas proposed for management. The probability of occurrence in areas that would be affected by project activities is low; therefore, the effects determination for these species is 'may impact individuals but would not lead to a loss of viability or trend toward federal listing'
Running buffalo clover (RBC)	MIIH	This species is typically found on limestone-derived soils in mesic environments with partial to filtered sunlight and a prolonged pattern of moderate and periodic disturbance. Limited potential habitat exists within the project area. Recent surveys did not detect any occurrences. Of four historic occurrences within the project area, the three within areas of potential activity were unable to be located during the 2021 survey period. Potential for occurrence of RBC in the proposed activity areas appears to be low; however, presence cannot be ruled out entirely because there is the potential for undetected populations.
Roan Mountain sedge	MIIH	This species is typically found in hardwood forests and woodlands in high-elevation areas associated with mesic sites, including cove forests and northern hardwood forests. One occurrence was detected and would be protected by the Botany-1 design feature.

Species	Determination*	Rationale (or refer to project documentation)
Appalachian violet	MIIH	This species usually occurs within a rich, moist forest community matrix in partially-open to open sites. One occurrence detected during 2021 surveys would be protected by the Botany-1 design feature.
Butternut	MIIH	This species is shade intolerant and typically found in rich loamy soils, mixed hardwood forests, open fields, riparian zones, along ridges, or in edge habitat. Two historic occurrences would be protected by the Botany-1 design feature.

NI – no impact; **MIIH**- may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species; **WIFV** - will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species

Wildlife Species

Of the 74 RFSS terrestrial wildlife species known or expected to occur on the Monongahela National Forest, 52 species were eliminated because the project area is outside of known species range, lacks suitable habitat, or the habitat occurs in the project area but outside of proposed activities. The remaining 22 species are addressed in Table 20.

Table 20. Terrestrial wildlife sensitive species impact determinations

Species	Determination*	Rationale (or refer to project documentation)
Southern Rock Vole	MIIH	Southern rock vole habitat (rocky, riparian areas) would be avoided in commercial timber harvests due to riparian buffers required by Forest Plan direction. During project development, two harvest units were identified as areas that could have potential habitat for Southern rock voles. These units were adjusted to avoid cove forests which provided a wider buffer on the riparian areas. Adjacent timber activities do not appear to adversely affect this species in the short-term and may improve its habitat as rock vole abundance has been documented as being higher at harvested sites versus unharvested.
Eastern Small-footed Myotis	MIIH	Limited rock formations exist within the project area and are typically avoided during commercial timber harvest due to their steep terrain. Timber harvest and prescribed burning would increase open spaces for foraging. Soil restoration activities on existing linear features would provide opportunities to create water sources for bats and improve foraging opportunities.
Little Brown Myotis	MIIH	Short-term impacts to individuals associated with timber harvest and prescribed burning may occur due to the potential loss of roost trees. This would also produce a long-term beneficial impact in increased open spaces for foraging. Enhancements to riparian areas would improve foraging habitat. Soil restoration activities on existing linear features would provide opportunities to create water sources for bats and improve foraging opportunities.
Allegheny Woodrat	MIIH	Species lives almost exclusively in rocky areas located in or around hardwood forests that have an abundance of oaks and other mast-bearing trees. Timber harvest activities, may affect individuals, but may also provide a beneficial impacts of increasing food availability by opening the forest floor and encouraging understory growth. Allegheny woodrats are known to forage in young clearcuts.

Species	Determination*	Rationale (or refer to project documentation)
Tricolored Bat	MIIH	Short-term impacts to individuals associated with timber harvest and prescribed burning harvest may occur due to the potential loss of roost trees. Timber harvest and prescribed burning would increase open spaces for foraging and long-term beneficial impacts would occur. Enhancements to riparian areas would improve foraging habitat. Soil restoration activities on existing linear features would provide opportunities to create water sources for bats and improve foraging opportunities.
Southern Water Shrew	MIIH	Impacts to individuals and habitat would be reduced due to avoidance of riparian buffer areas with timber harvest activities. Stream and riparian restoration would benefit the southern water shrew because they rely on high-integrity streams. Treating existing linear features bordering streams within Southern water shrew habitat could reduce the amount of sedimentation or pollutants entering waterways.
Long-eared Owl	MIIH	Adverse impacts to individuals would be unlikely because they are not known to occur in the project area. The species is known to remain well concealed during the day in dense evergreen areas (Buckelew and Hall 1994), which are limited within proposed harvest units. Creation of open areas within or near forest edges through commercial timber harvest would improve foraging and nesting habitat.
Olive-sided Flycatcher	MIIH	This species abundance responds positively to some types of forest harvesting, such as commercial thinning particularly when snags and residual trees remain for perching and nesting. The species has been readily observed in two story stands and modified clearcuts and rarely observed in small-patch or unharvested stands. They frequently nest in early successional post-fire forest in mountainous areas. Project activities should have a beneficial effect.
Bald Eagle	MIIH	Although bald eagles could frequent the project area, there are no documented instances of nesting within proposed areas for active management. Vegetation management activities could attenuate potential nest trees however key habitat features around the Cheat River are not located within areas proposed for vegetation management.
Loggerhead Shrike	MIIH	The shrike typically nests in dense brush, hedgerows, or isolated trees in pastureland. Expansion of riparian buffers within current hay cultivation fields would provide beneficial impacts by adding structure along field edges for nesting. There are no Forest Service grazing allotments in the project area.
Red-headed Woodpecker	MIIH	Red-headed woodpeckers would benefit from selective thinning which makes maneuvering easier during hunting and may create additional snags from residual trees. Forest Plan guidance requires retaining snags within even-aged management stands and these features would provide beneficial perching structures in foraging areas. The use of prescribed fire would provide beneficial habitat by creating open spaces and increasing dead standing trees.
Nashville Warbler	MIIH	This species often utilizes edge and openings, including along roads and edges created by timber harvesting. Beneficial impacts could occur from riparian enhancements and the creation of nesting habitat from edge creation due to timber harvest. Foraging and nesting habitat would be improved through the creation of early successional habitat. No negative impacts are expected from proposed activities.

Species	Determination*	Rationale (or refer to project documentation)
Northern Waterthrush	MIIH	The addition of riparian buffers in timber harvest areas would reduce the risk of impacts. In the short-term, fire may impact habitat suitability for birds that nest on the ground or in shrubs by reducing ground cover. Prescribed fire on a long-term frequent basis or across a large spatial scale is likely to have impacts on ground nesting and low-shrub nesting birds. Studies show that the northern waterthrush were strongly associated with unburned areas over burned sites. Prescribed burning activities would be completed during periods outside of the breeding season (May-August) which would minimize any potential adverse effects. Additionally, fire intensity would be low around riparian and wetland areas which would reduce the possible effects on prey and habitat.
Cerulean Warbler	MIIH	Management actions that would be beneficial to enhance and maintain cerulean warbler habitat features were included in the project during the design phase in these areas. These actions included maintaining oak ridgetops that are currently providing suitable habitat, reducing even-aged harvest units to approximately 20 acres, incorporating thinning harvests, creating oak savannahs, and managing it with prescribed fire. These strategies were incorporated in the Dry Run and Jonathan Run areas where there are documented occurrences and in adjacent areas on Clover Run. In addition, timber stand improvement in young stands would provide additional benefits by providing mature oak forests in the long-term.
Golden-winged Warbler	MIIH	Early successional habitat created through timber harvest can be beneficial for golden-winged warblers. Regenerating stand vegetation structure typically becomes suitable for the golden-winged warblers around 4-5 years and lasts until the stem exclusion or pole stage at 15-20 years. Savannah areas that have residual trees in combination with shrubs would likely provide suitable habitat conditions for the species.
Timber Rattlesnake	MIIH	There is a risk to individuals in the areas proposed for management during their active season (spring – fall). Timber activities would be beneficial in the long term unless denning sites were compromised. No known denning locations occur within harvest units. Timbering and prescribed fire have largely beneficial long-term impacts to the species. The opening of the forest floor will increase thermal regulation and prey availability. Stream restoration should have little to no impacts on timber rattlesnakes at a population level. Creating and maintaining open habitats important to the life-history attributes of rattlesnakes, such as savannahs, through a variety of vegetative management practices (e.g., harvest, prescribed fire, mowing, etc.) would help contribute to their conservation.
Green Salamander	MIIH	Due to the steep terrain, safety concerns, and equipment limitations, commercial harvest is not typically conducted in the immediate vicinity of rock outcrops. There are limited rock outcroppings within the project area; however green salamanders are known to occur under rotting bark and logs, which can be found within the area.
Yellow-banded Bumble Bee	MIIH	Suitable habitat may exist within open areas, along roadsides or within riparian areas. Timber harvest, prescribed fire, savannah creation and riparian enhancements would improve habitat conditions. Short-term impacts may occur, however the increase in open space and herbaceous cover would improve foraging habitat. Although short-term impacts could occur within wildlife openings due to maintenance that would temporarily remove potential food sources, long-term benefits would occur by removing undesirable species and improving pollinator species.

Species	Determination*	Rationale (or refer to project documentation)
Monarch	MIIH	Timber harvest under the right conditions can be used to improve habitat conditions for Monarch butterflies. Thinnings can create canopy gaps allowing more sunlight to reach the understory, promoting growth of the herbaceous layer providing nectar sources for the species. Regeneration harvests can create large openings promoting early successional habitat and herbaceous growth for several years. Savannahs are managed for fewer trees and abundant herbaceous vegetation, with trees scattered to allow herbaceous vegetation to persist. This management activity would likely benefit the species creating more potential breeding habitat. Prescribed fire has been used as an effective management tool for improving habitat conditions for monarch butterflies and other pollinators and to promote nectar sources used by monarchs during migration periods. The use of herbicides could remove milkweeds and other important native plants used by the species. Long-term benefits are expected to occur from project activities. Although short-term impacts could occur within wildlife openings due to maintenance that would temporarily remove potential food sources, long-term benefits would occur by removing undesirable species and improving pollinator species.
A Geometrid Moth	MIIH	Specific habitat requirements for this species are unknown but appears to occupy areas within hardwood forests. Therefore, impacts could result from vegetation management activities, prescribed fire, and riparian actions.
A Noctuid Moth	MIIH	The species is challenging to document since they are either naturally rare or spend most of their time in the tree canopy. Although short-term impacts could occur within wildlife openings due to maintenance that would temporarily remove potential food sources, long-term benefits would occur by removing undesirable species and improving pollinator species.
West Virginia White	MIIH	This species is sensitive to forest fragmentation. Timber harvest and associated activities may reduce preferred habitat through fragmentation.

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Table 21. Applicable project file documentation to support agency sensitive species compliance

Supporting Documentation	File Name(s)
Aquatics Specialist Report	UCR_SpecialistAnalysis_Watershed_2021.12.11
Biological Evaluation for Terrestrial Wildlife	UCR_BE_01212022
Botany/Ecology Specialist Report	UCR_BotanyEcologySpecialReport_20211227
OAR	TES_OAR_Masterlist_508checked

Special Management Areas (for example, Wilderness, Roadless, Wild and Scenic Rivers, etc.)

The project area contains no special management areas.

National Historic Preservation Act – Section 106 Review

No adverse effects to historic properties - 36 CFR 800.5(b). Section 106 Review has been completed and National Register eligible cultural sites are located within the project area. Modifications can avoid/protect cultural resources (see comment section).

For the purpose of this analysis, effect means the alteration to the characteristics of a historic property qualifying it for inclusion in, or eligibility for, the National Register of Historic Places (NRHP) per the definition in 36 CFR 800.16(i). Historic property means any prehistoric or historic district, site, building, structure, object or historical/cultural landscape included in, or eligible for inclusion in, the NRHP. The term historic property also applies to any cultural resource or property not yet evaluated to determine whether it is eligible for the NRHP. The term includes artifacts, features, records, and remains that are related to and located within such properties. The term also includes properties of traditional religious and cultural importance to an Indian tribe or native Hawaiian organization and that meet the National Register criteria per the definition in 36 CFR 800.16(l).

The area of potential effect for the analysis is the project area boundary. The proposed action would have no adverse effect to historic properties because standard protection measures would eliminate or minimize direct and indirect effects to historic property. Design criteria have been incorporated to prevent or eliminate adverse effects to those properties. Standard protection measures were developed in collaboration with consulting parties. All historic properties identified would be marked and avoided during all phases of project implementation. Ground disturbing activities shall be prohibited within marked boundaries of historic properties.

Government to Government Consultation (EO 13175)

The responsible official identified the following regarding Government to Government consultation:

Government to Government Tribal consultation planned

Nation-to-Nation consultation is ongoing. Standard protections measures have already been developed in collaboration with United Keetoowah Band of Cherokee Indians, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, Shawnee Nation, Delaware Nation, and Seneca Nation as part of the programmatic agreement. All cultural resources technical reports will be provided to consulting nations for comment prior to decision from the Responsible Official.

Multiple Use Sustained Yield Act

Produce a sustained yield of products and services, which means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of National Forests without impairment of the productivity of the land. The proposed action is expected to be implemented in consistency with the Act. The reforestation activities in the proposed action would provide for adequate regeneration for a sustained yield.

Migratory Bird Treaty Act

Implementation of this law on Federal lands was further clarified by Executive Order 13186 of January 2001 (66 FR 3853). The Forest Service entered into a Memorandum of Agreement (MOU) (FS Agreement # 08-MU-1113-2400-264) with the US Fish and Wildlife Service, which was extended until December 2017 to promote the conservation of migratory birds on National Forest System lands (see section D. 3. a-d, pages 6-7). Although the MOU has expired, the Forest Service still manages in accordance with the expired MOU that implements the Executive Order. The proposed action would abide by the direction contained in these documents to the extent practicable. No activities included in the proposed action would intentionally take migratory birds. Although some of the actions may incidentally result in impacts to migratory birds, this project would avoid measurable negative effects at the population level of migratory bird species. In compliance with the Forest Plan and to the extent practical, we have

designed projects to minimize such incidental impacts, while still enabling implementation of the proposed activities. This project would therefore meet the direction contained in the Executive Order 13186.

Relevant Executive Orders

The responsible official determined the proposal complies with the following Executive Orders, which were deemed relevant based on the nature of the proposal.

EO 11988, Floodplain Management

Mandates that Federal agencies avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The proposed action is expected to be implemented in consistency with the Order. Actions proposed for floodplains are expected to improve floodplain condition.

EO 11990, Protection of Wetlands

Mandates that Federal agencies avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. The proposed action is expected to be implemented in consistency with the Order. Actions proposed for wetlands are expected to improve wetland condition and occurrence.

EO 12962, Enhancing Aquatic Systems to Increase Recreational Fisheries

Mandates that Federal agencies, to the extent permitted by law and where practicable, improve the quality, function, and sustainable productivity and distribution of U.S. aquatic resources for increased recreational fishing opportunities. The proposed action is expected to be implemented in consistency with the Order. Aquatic habitat enhancements are expected to improve aquatic habitat and recreational fishing opportunities.

EO 12898, Environmental Justice

This executive order requires determination whether minority and/or low-income populations would experience disproportionately high adverse effects due to project implementation. Based on data retrieved from the United States Census Bureau (2021), the proposed action would not disproportionately affect minority and/or low-income populations (Table 22). Both Tucker and Preston Counties have a lower percent minority population, lower percent of population below the poverty level, and a higher median household income than the state of WV. Barbour County has a lower median household income and a higher poverty level than WV; however, less than one acre of timber harvest is proposed within Barbour County.

Project activities were not sited based on the socioeconomic condition of the local populations, but rather selected based on the existing conditions and the desired future conditions within the project area which will move the project area closer to the desired future conditions as identified in the Forest Plan.

Table 22. U.S. Census Bureau data retrieved December 2021

Administrative Unit	Total Population	% Minority	% Below Poverty Level	Median Household Income
Tucker County	6,762	4.9%	12.5%	$49,118
Preston County	34,216	9.9%	15.4%	$51,888
Barbour County (minimal acreage within project area)	15,465	7.0%	20.8%	$38,459
West Virginia	1,793,716	10.2%	16.0%	$48,850

EO 13112, Invasive Species

Prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. The proposed action is expected to be implemented in consistency with the Order. Measures included in the proposed action would lessen the introduction of species. Existing populations were documented during summer 2021 plant surveys and populations needing control would receive treatment in accordance with the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment.

Additional Effects Analysis

This section includes effects pertaining to carbon and greenhouse gas emissions, vegetation and timber resources, ecology, hydrology and aquatics resources, soils resources, and recreation and scenery resources that have been identified for detailed analysis based on internal or public comment:

- Vegetation management activities may affect the carbon stock.
- Timber harvests may impact stand age class distribution.
- Timber harvest methods may affect the economics of the local region.
- Herbicide use may affect public health.
- Proposed vegetation management activities may affect late-successional habitat and mixed-mesophytic and cove forest types.
- Vegetation management and associated activities, road construction and maintenance, and wildlife enhancements may affect non-native invasive species (NNIS) propagation and establishment.
- Vegetation removal may affect watershed hydrology.
- Roads and skid trails may affect watershed hydrology, sediment processes, and stream temperatures. Effects may be greater on steep and very steep slopes.
- The use of herbicide may impair water quality.
- Watershed restoration activities may provide improvements to watershed processes, aquatic habitat, and aquatic organisms.
- Climate change may continue to increase stress on coldwater aquatic communities through increased temperatures and more extreme weather events, interacting with other effects cumulatively.

- Alterations to water quality, quantity, and aquatic habitat may pose a risk to aquatic RFSS and MIS.
- Road, skid trail, and landing construction and use may result in erosion, soil compaction, decreased soil productivity, and detrimental soil disturbance. Risk of these effects to the soil resource are increased in areas of steep slopes and wet and/or unstable soils.
- Wildlife habitat enhancements may result in erosion, soil compaction, decreased soil productivity, and detrimental soil disturbance.
- Proposed vegetation management activities may compound effects of acidic deposition potentially resulting in changes to nutrient cycling and soil productivity.
- Prescribed fire may affect soil chemistry, nutrient cycling, and soil productivity.
- Watershed restoration activities may improve long-term soil productivity.
- Climate change may further stress soil productivity, particularly in areas where soil productivity has already been negatively impacted through acid deposition or soil disturbance.
- Treatment of existing linear features and opening currently closed roads may change dispersed recreation access (hunting, hiking, etc.)
- Commercial timber harvests may be visible from popular viewpoints and travel routes.

Carbon and Greenhouse Gas Emissions

Effect: Vegetation management activities may affect the carbon stock

Forests play an important role in the global carbon cycle by taking up and storing carbon in plants and soil. Forestry has gained attention in recent decades because of its potential to influence the exchange of carbon with the atmosphere, either by increasing storage or releasing carbon emissions. Forests have a carbon “boom and bust” cycle. They take up and store atmospheric carbon as they grow through photosynthesis and release carbon through mortality due to aging or disturbances. Following mortality events, forests regrow and the cycle continues. Forests can store carbon in soils and plant material as well as in harvested wood products outside of the forest ecosystem. In addition, wood fiber can be used to substitute for products that are more energy-intensive to produce, such as concrete and steel, creating a substitution effect which can result in lower overall greenhouse gas emissions.

A complete and quantitative assessment of forest carbon stocks and the factors that influence carbon trends (management activities, disturbances, and environmental factors) for the Monongahela National Forest (NF) is available in the project record (McKinley et al., 2021). This carbon assessment contains additional supporting information and references.

The effects analysis area for carbon includes forested lands within the Monongahela NF because this is where timber harvests and prescribed burning treatments are proposed and where carbon stocks may be affected. The effects analysis for greenhouse gas emissions is the global atmosphere given the mix of atmospheric gases can have no bounds. The timeframe for the analysis is 10 years because all project activities should be completed by then. The proposed Upper Cheat River project would be conducted on approximately 33,991 acres of National Forest System lands within the Monongahela NF. This scope and degree of change would be minor, with timber and fire activities affecting approximately one half of one percent (0.5%) of the 955,665 acres of forested land in the Monongahela.

The carbon legacy of the Monongahela NF is tied to the history of Euro-American settlement, land management, and disturbances. As the first region to be widely settled in the United States, eastern forests have had a long history of intensive harvesting and conversion of forest to agriculture. Historical disturbance dynamics, forest regrowth and recovery, and forest aging have been most responsible in driving carbon accumulation trends since 1950. The lands known today as the Monongahela National

Forest could hardly have been called a “forest” in the early 1900s. Repeat wildfires, clearing of steep mountain land for farming and grazing, and widespread unregulated logging led to severe erosion and increased flooding. As a result, by the early 1900s, much of the higher elevation mountains and ridges of West Virginia had been transformed into charred stumps and brush fields. In 1920, the Monongahela NF was established as one of the first National Forests in the eastern United States (McKinley et al., 2021). This legacy of timber harvesting and early efforts to restore the forest is visible today, influencing forest age structures, tree composition, and carbon dynamics (Birdsey et al., 2006). Forests in the Monongahela NF are maintaining a carbon sink and forest carbon stocks have increased by about 23 percent between 1990 and 2013 (USDA Forest Service, 2015). The negative impacts on carbon stocks caused by disturbances and environmental/climate conditions have been modest and exceeded by forest growth. Over half of the stands in the Monongahela NF are middle-aged and older (greater than 80 years) and there has been a sharp decline in new stand establishment in recent decades (Birdsey et al., in press). If the Forest continues on this aging trajectory, more stands will reach a slower growth stage in coming years, potentially causing the rate of carbon accumulation to decline.

According to satellite imagery, timber harvest has been the dominant disturbance type on the Monongahela NF since 1990, although harvesting has typically affected less than 0.3 percent of the forested area annually (Birdsey et al., 2019). During this period, about 2.2 percent of the forested area experienced some level of harvest treatments. Carbon losses from the forest ecosystem associated with harvests have been relatively small compared to the total amount of carbon stored in the forest, with losses from 1990 to 2011 equivalent to about 0.9 percent of non-soil carbon stocks (Birdsey et al., in press). However, these estimates represent an upper bound, because they do not account for continued storage of harvested carbon in wood products or the effect of substitution.

Records from the Monongahela NF indicate the forest prescribed burned an average of 1,282 acres annually between 2008 and 2021, with a total of approximately 22,104 acres total burned in this period. Additionally, from 1990 to 2021, there have been 238 wildfire incidents totaling 5,763 acres. Satellite imagery shows fire has caused notable disturbance on just 420 acres of the Monongahela’s forested area from 1990 to 2011 (Birdsey et al., in press; USDA Forest Service 2021; USDA Forest Service 2006). Many fires that burned primarily along the forest floor were undetected by the satellite imagery because they did not cause a change in canopy cover. As the vast majority of the acreage that was prescribed burned during this time period was not detected, the prescribed fires are having a limited impact on carbon storage, particularly as compared to wildfire. Carbon losses from the forest ecosystem associated with fires have been relatively small compared to the total amount of carbon stored in the forest, with losses from 1990 to 2011 equivalent to about 0.2 percent of non-soil carbon stocks.

The effect of the proposed action focuses on the aboveground carbon pool that is stored in live woody vegetation at least one inch in diameter, which comprise about 45 percent of the total ecosystem carbon stocks of the Monongahela (USDA Forest Service, 2015). The effect of the proposed prescribed fire focuses on the understory and forest floor pools, which together comprise about 10.5 percent of the Forest-wide ecosystem carbon stocks. About 32 percent or more of the ecosystem carbon is in mineral soils, a very stable and long-lived carbon pool (McKinley et al., 2011; USDA Forest Service, 2015; Domke et al. 2017). Timber harvesting and prescribed burning generally result in a negligible amount of carbon loss from the mineral soils typically found in the United States, particularly when operations are designed in a way that minimizes soil disturbance (Nave et al., 2010; McKinley et al., 2011). Although timber harvest and prescribed fire can also affect the carbon stored in the understory and forest floor organic layer consisting of debris in various stages of decomposition, the carbon loss would be negligible given it is not stable or long-lived and would be replaced within months to a few years.

The Upper Cheat River project proposes 3,463 acres of even-aged hardwood regeneration through cable yarding, helicopter, and conventional methods. An additional 154 acres of commercial thinning and 34 acres of commercial overstory removal, and 1,060 acres of timber stand improvement harvests are proposed. The harvests are proposed in order to diversify timber stand age classes throughout the project area to meet desired conditions in the Monongahela NF’s Forest Land and Resource Management Plan. In the absence of timber harvests, the forests where this proposed action would take place will thin

naturally from mortality-inducing natural disturbances and other processes resulting in dead trees that will decay over time, emitting carbon to the atmosphere. The wood removed from the forest in this proposed project will be transferred to the wood products sector for a variety of uses, each of which has different effects on carbon (Skog et al., 2014). Carbon can be stored in wood products for a variable length of time, depending on the commodity produced. Wood can be used in place of other materials that emit more greenhouse gases (GHGs), such as concrete, steel, and plastic (Gustavsson et al., 2006; Lippke et al., 2011; McKinley et al., 2011).

The Intergovernmental Panel on Climate Change (IPCC) recognizes wood and fiber as a renewable resource that can provide lasting climate-related mitigation benefits that can increase over time with active management (IPCC 2000). Furthermore, by reducing stand density, the proposed action may also reduce the risk of more severe disturbances, such as insect and disease outbreak and severe wildfires, which may result in lower forest carbon stocks and greater GHG emissions.

The Upper Cheat River Project proposes 920 acres of prescribed burns across three burn blocks as a tool to promote oak regeneration and maintain and enhance wildlife habitat. Many forest species of Eastern Region are well adapted to fire and in some cases may depend on it for survival and regeneration. Historical fire suppression has allowed some fire-dependent forests to become unnaturally dense and allowed surface fuels to build up in some areas of the region along with altering species composition and structure (Nowacki and Abrams, 2008 and Olson, 1996). Furthermore, climate change has caused warming temperatures and increasing intensity and frequency of droughts, which has led to increased wildfire activity in many forest types (Westerling et al., 2006). In the absence of prescribed fire to reduce stand density and fuel loads, the fire-adapted forest where the proposed treatments would take place may be more at risk to large and higher-severity wildfires (Olson, 1996), resulting in decreased ecosystem services and potentially increased carbon emissions. High-severity fires, especially when they occur repeatedly, can affect human health and safety, infrastructure, and ecosystem services, and can cause delayed regeneration or even a transition of forests to non-forest ecosystems in some areas (e.g., Haffey et al., 2018). By reducing the threat of wildfire, the proposed action would create conditions more advantageous for supporting forest health in a changing climate and reducing GHG emissions over the long term.

Prescribed fires generally target surface and ladder fuels and are typically less severe than wildfires (Agee and Skinner, 2005), because they are conducted only when weather conditions are optimal and fuel moisture is high enough to keep combustion and spread within predetermined limits. Thus, prescribed fires result in minimal overstory tree mortality and typically combust fuels consisting of leaf litter and small woody debris (Stanis et al., 2019; Hutchinson et al, 2005), producing lower GHG emissions than might be emitted if the same area were to burn in a high-severity wildfire (Wiedinmyer and Hurteau 2010).

By reducing vegetative competition in the understory, the proposed prescribed burnings (some following harvest) would help establish oak that would provide additional mast for wildlife and increase the ability of harvested areas to regenerate more quickly. This would help to support forest health in a changing climate and reducing GHG emissions over the long-term. Carbon emissions associated with prescribed fires are mostly from duff, litter, and dead wood which would otherwise decay quickly over time, releasing carbon to the atmosphere, even in the absence of fire. Furthermore, any initial carbon emissions from this proposed action will be balanced and possibly eliminated as the stand recovers and regenerates, because the remaining trees and newly established trees typically have higher rates of growth and carbon storage (Hurteau and North, 2009; McKinley et al., 2011).

Climate change is a global phenomenon, because major GHGs[3] mix well throughout the planet's lower atmosphere (IPCC 2013). Considering emissions of GHGs in 2010 were estimated at 13,336 ± 1,227 teragrams[4] carbon globally (IPCC 2014) and 1,881 teragrams carbon nationally (US EPA, 2015), the Upper Cheat River project makes an extremely small direct contribution to overall emissions. Because local GHG emissions mix readily into the global pool of GHGs, it is difficult and highly uncertain to ascertain the indirect effects of emissions from single or multiple projects of this size on global climate. Any initial carbon emissions during the implementation of the proposed project would have a temporary influence on atmospheric carbon concentrations, because carbon will be removed from the atmosphere as forests regrow, minimizing or mitigating any potential cumulative effects.

From 2000 to 2009, forestry and other land uses contributed 12 percent of the human-caused global CO2 emissions[5] (IPCC, 2014). The forestry sector's contribution to GHG emissions has declined over the last decade (IPCC, 2014; Smith et al., 2014; FAOSTAT, 2013). The largest source of GHG emissions in the forestry sector globally is deforestation (e.g., conversion of forest land to agricultural or developed landscapes) (Pan et al., 2011; Houghton et al., 2012; IPCC 2014). However, forest land in the United States has had a net increase since the year 2000, and this trend is expected to continue for at least another decade (Wear et al., 2013; USDA Forest Service, 2016). The proposed activities in the Upper Cheat River project will not result in the loss of forest land from the Monongahela NF. In fact, forest stands are being retained and managed to improve age class distribution, retain and enhance wildlife habitat, promote oak regeneration and increase forest structure thus contributing to long-term carbon uptake and storage.

Some assessments suggest that the effects of climate change in some United States forests may cause shifts in forest composition and productivity or prevent forests from fully recovering after severe disturbance (Anderson-Teixeira et al., 2013), thus impeding their ability to take up and store carbon[6] and retain other ecosystem functions and services. Climate change is likely already increasing the frequency and extent of droughts, fires, and insect outbreaks, which can influence forest carbon cycling (Kurz et al., 2009; Allen et al., 2010; Joyce et al., 2014). Reducing stand density is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Joyce et al., 2014). This proposed action is consistent with options proposed by the IPCC for minimizing the impacts of climate change on forests, thus meeting objectives for both adapting to climate change and mitigating GHG emissions (McKinley et al., 2011). Given the combination of disturbance types that can reduce carbon storage and alter ecosystem functions proposed in this project, the relatively small quantity of carbon released to the atmosphere and the short-term nature of the effect of the proposed action on the forest ecosystem are justified (Millar et al., 2007; D'Amato et al., 2011).

In summary, this proposed project affects a relatively small amount of forest land and carbon on the Monongahela and might temporarily contribute an extremely small quantity of GHG emissions relative to national and global emissions. This proposed action will not convert forest land to other non-forest uses,

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[3] Major greenhouse gases released as a result of human activity include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, and perfluorocarbons.

[4] This report uses carbon mass, not CO_2 mass, because carbon is a standard unit and can easily be converted to any other unit. To convert carbon mass to CO_2 mass, multiply by 3.67 to account for the mass of the oxygen (O_2).

[5] Fluxes from forestry and other land use (FOLU) activities are dominated by CO_2 emissions. Non-CO_2 greenhouse gas emissions from FOLU are small and mostly due to peat degradation releasing methane and were not included in this estimate.

[6] The term "carbon" is used in this context to refer to CO_2.

thus allowing any carbon initially emitted from the proposed action to have a temporary influence on atmospheric GHG concentrations, because carbon will be removed from the atmosphere over time as the forest regrows. Furthermore, the proposed project will transfer carbon in the harvested wood to the product sector, where it may be stored for up to several decades and substitute for more emission intensive materials or fuels. This proposed action is consistent with internationally recognized climate change adaptation and mitigation practices.

Table 23. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Forest wide Carbon Assessment	UCR_SpecialistAnalysis_Carbon_20211206

Vegetation and Timber Resources

Effect: Timber harvests may impact stand age class distribution

This project proposes to regenerate approximately 10% of the National Forest System (NFS) land within the project area through clearcut with reserves and shelterwood harvests. Thinning units would have no effect on the age-class distribution, since the overstory remains largely intact. The 25 acres of savannah creation would convert forest land into open/brushy habitat for wildlife. This treatment would increase early successional habitat and improve the age-class distribution for the project area. These actions would result in a 134 percent increase in early successional habitat and would move the project area towards the desired conditions of Management Prescription 3.0 and the more balanced age class structure called for in the Forest Plan (Figure 3). Given the current NEPA planning process on the Monongahela National Forest, each watershed project area on the North Zone is expected to be revisited every 11 years. In the next planning entry cycle, the proposal would be developed to meet desired conditions of the Forest Plan.

Approximately 24% of the project area was deemed currently unsuitable for timber harvesting given restrictions and limitations in the Forest Plan, patchwork land ownership, and access issues. Because timber harvest is not likely to occur in these areas, these stands are expected to progress through the age classes over time. If no action is taken in this project area, a 164% increase in late successional habitat would be expected. Even with regenerating 10% of the stands through the proposed action, late successional habitat would still increase by 138% in the next ten years because many of the stands are approximately the same age.

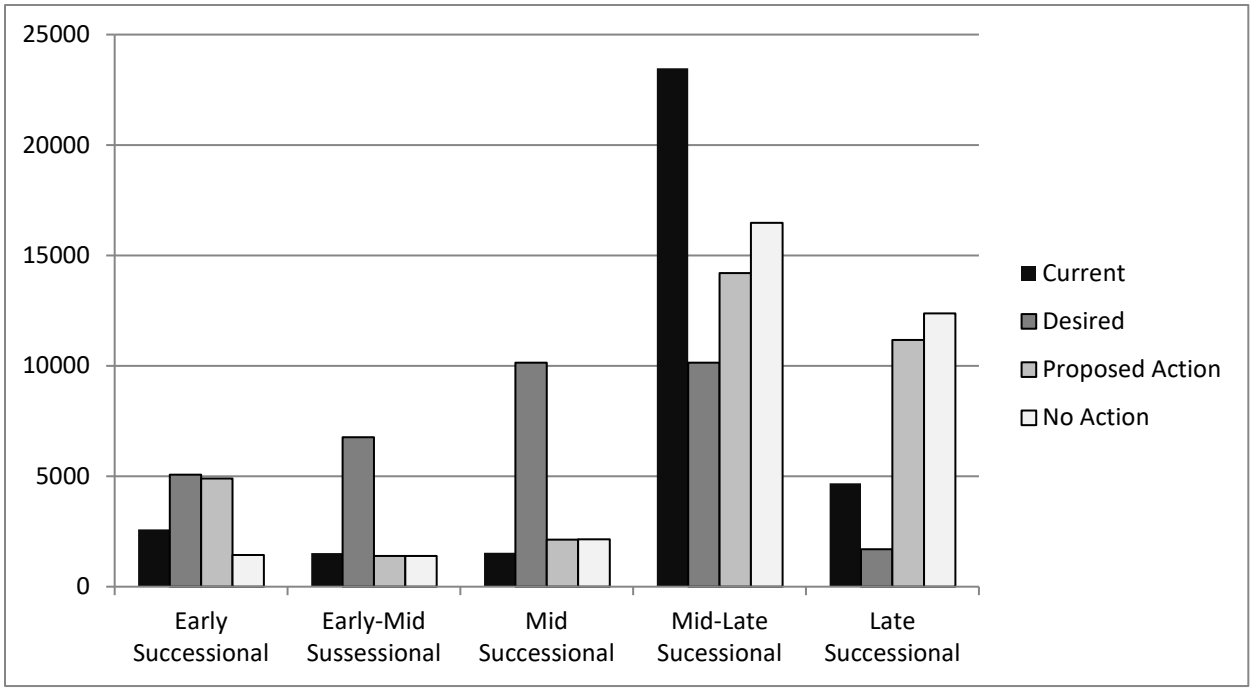

Figure 3 Current and Desired Class Distributions for the Upper Cheat Project in acres. The Proposed Action and No Action display age classes projected 10 years from completion of the proposed action or no action taken.

All of the harvesting units occur in landclass types compatible with timber production. In the regeneration harvest units, most trees greater than one inch in diameter breast height would be felled except for reserve trees. There would be little or no effect from the timber harvesting on the adjacent stands, as harvesting operations stay within clearly marked boundaries. The only time adjacent stands could be affected would be when roads are constructed through them to access the harvest units.

Past NFS timber harvests within the project area added to those in the proposed action would amount to about 21% of NFS lands having been regenerated since the 1980s. The past harvesting along with the harvesting in the proposed action will move the project area towards the desired age-class distribution.

Effect: Timber harvest methods may affect the economics of the local region

Public comments expressed concern over the amount of helicopter harvest proposed, specifically the monetary loss to West Virginia due to the lack of local helicopter harvest companies. Of the hardwood regeneration timber units, approximately 28% of the harvest is proposed for conventional harvest, 17% is proposed for cable harvest, and 55% is proposed for helicopter harvest. Limitations in the project area based on private ownership or Forest Plan guidance (e.g., lack of access, hillslope) prevent the use of ground-based timber harvest in certain areas. Per feedback following the public open house, an option for cable yarding was added to the proposed action to add a more viable local harvest option than helicopter harvest. Units were identified that would not support conventional harvest due to one or more of these restrictions but had landscape attributes and vehicular access that provided an opportunity for cable harvesting.

Under the proposed action the local economy would benefit from the sale of timber. The proposed action is expected to generate approximately 6.4 million dollars in revenue and cost approximately 5.9 million dollars to implement over approximately the next decade (Table 24).

Table 24. Project costs for the Proposed Action

Proposed Action	Amount ($)
Road Costs	1,165,000
Timber Cost	1,274,350
Reforestation Cost	1,493,580
Watershed Costs	1,745,400
Wildlife Costs	206,500
Total Cost	5,884,830

The economic analysis shows that $3,692.25 per acre revenue is expected from conventional harvest, $2195.25 from cable harvest, and $629.25 from helicopter harvest. This is based on the assumptions that helicopter logging would cost $400 per thousand board feet and cable logging would cost $300 per thousand board feet. This translates into an additional cost of $5,715,000 for proposed helicopter logging over the proposed conventional logging. Helicopter logging must occur leaf-off for safety reasons, which requires winter access to helicopter landings and increased cost of road maintenance. Due to restrictions in the Forest Plan and other resource concerns, helicopter logging is the only way to harvest many of the units in the project area. Helicopter logging makes it possible to harvest in areas not suitable for ground-based logging, thus moving the project area towards its desirable age-class and providing timber volume for the local economy. Eliminating these stands which are only suitable to helicopter logging would result in a potential loss of approximately $1,198,721.25 in revenue.

The economic analysis resulted in an estimated present value (PV) cost of -$7,198,899 for the proposed action and an estimated PV benefit of $5,832,887. Due to the higher costs of helicopter logging and costs associated with restoration actions (e.g., skid trail treatment, temporary road treatment, tree planting, and wildlife actions), the economic analysis for the projects shows a negative present net value (PNV) of -$1,366,012 and a benefit/cost ratio less than one (0.81). A negative PNV and benefit/cost ratio less than one indicates a poor economic return for the project. This is due to the high costs of the watershed, wildlife and reforestation activities, along with the reduced revenues generated from the timber sales due to the large amount of helicopter yarding in the proposed action. This negative PNV and low B/C ratio does not take into account the non-monetized ecosystem benefits of those watershed, wildlife, and reforestation activities along with the potential increase in recreation users attracted to these areas, which could in turn also positively impact local economies.

Effect: Herbicide use may affect public health

Risk assessments were compiled for all herbicides proposed for use using Syracuse Environmental Research Associates (SERA) models created for the Forest Service to better predict the effects of pesticide use (SERA 2004, SERA 2011, SERA 2011, SERA 2011). No adverse risks were identified for the general public or wildlife. Drift from the herbicide applications is not likely as all applications will be hand applied. Herbicide application would not occur in proximity to known drinking water sources and a timber harvest boundary was adjusted as a result of scoping results to avoid the watershed of a spring source. Results of the risk assessment for the project show the typical exposure rates for a worker are not a concern, except for the use of gloves contaminated with triclopyr for more than one hour, which was the only hazard quotient above one.

Table 25. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Vegetation Specialist Report	UCR_VegReport_12142021

Ecology

Effect: Proposed vegetation management activities may affect late-successional habitat and mixed-mesophytic and cove forest types

The spatial boundary of the analysis is the project area boundary. Activities that could directly impact forest age-class structure and composition would be implemented within 10 years after the NEPA decision is signed. The temporal boundary for changes to forest age-class structure and composition is 120 years from the beginning of project implementation. While effects to individual species may not persist that long, successional changes set in motion by regeneration harvesting would continue for at least that long.

The majority (99.5%) of the watershed is within management prescription (MP) 3.0 (Vegetation Diversity), which emphasizes age class diversity and sustainable timber production, a variety of forest scenery, habitat for wildlife species tolerant of disturbances, such as deer, grouse, and squirrel, and is a primarily motorized recreation environment. In addition to Management Prescription guidance, consideration of land ownership drove the development of the proposed action. Private land is interspersed with or borders National Forest System land, creating some inaccessible areas.

One goal of the proposed action is to enhance the diversity of forest vegetative cover by ensuring there is a variety of species, types, and ages. The current timber stand age distribution is skewed to mid-late and late successional stands. Therefore, the desired age-class is outside of that described in the Forest Plan and as shown in Figure 3. The Forest Plan indicates that roughly 3 to 8 percent of the area should be maintained or natural openings, while only 1% is currently open. Terrestrial wildlife and silvicultural work should be designed to improve forest stand health, while maintaining and restoring the watershed condition for aquatic wildlife species.

Figure 3 shows how the proposed action, or alternatively taking no action, affects age-class distributions in the project area ten years in the future. Even with the regeneration harvests in the proposed action, the amount of late successional habitat would increase by 138% over the next ten years. This increase is due to most of the stands in the project area being approximately the same age. Approximately 24.4% of the NFS land in the project area (8,278 acres) was deemed currently not available for commercial timber harvesting due to restrictions in Forest Plan guidance (steep slopes, riparian area buffers, etc.), economic reasons, or a lack of access. Not implementing the proposed action would lead to an even larger increase (164%) in late successional habitat, and 10,678 acres more than the desirable amount set in the Forest Plan (p. III-6). In ten years, the proposed action would result in approximately five times the amount of late-successional stands than listed as desired in the Forest Plan. The difference in the amount of late-successional forest in the project area in ten years when comparing the proposed action and no action are less than 1,200 acres (Figure 3).

Of these 8,278 acres that would not be managed for commercial timber production, 1,641 of these acres are currently and would remain in the late-successional age class. These 1,641 acres encompasses approximately 35% of all late-successional stands on NFS land in the project area. Additionally, many of these acres appear to overlap with a portion of The Nature Conservancy's hotspots for preservation and management of late-successional forests within the Hile and Horseshoe Run watersheds (which drain 6,554 acres, with 2,836 of these on NFS land). Of the NFS land within Hile and Horseshoe watersheds, 831 (or 29%) are in areas that are currently not available for commercial timber production.

Mixed mesophytic forests are classified as such due to the moderate amount of moisture they receive, which influences the vegetative community (Loucks et al.). Mixed mesophytic forests, especially within late successional areas, are one of the most biodiverse ecoregions in the world, harboring numerous tree canopy species, as well as numerous understory plants, shrubs, fungi, and animal communities (Martin 1992). Within some areas of mixed-mesophytic forests are cove forests, which are areas of the forest that are characterized by rich soils with a thick organic horizon, and healthy, tall tulip poplars and basswoods are generally indicative of these sites. Cove forests and other areas of mixed mesophytic forests are

important indicators of ecosystem health and occupy a large area within the central Appalachian region. Managing these forests for age-class diversity will help provide habitat structure for numerous species of plants and wildlife in the eastern U.S. that depend on this ecosystem (Martin 1992).

Mixed mesophytic forests and late successional habitats are also increasingly important as climate change continues to alter temperature and precipitation patterns throughout the Appalachian region. This ecoregion extends as far south as northwest Alabama and east-central Tennessee, and species endemic to these areas will need to migrate northward to stay within their optimal temperature and precipitation regimes (Loucks et al.). Maintaining healthy mixed mesophytic forests across the ecoregion will ensure that these species have refuges available and will aid in maintaining resilient forests capable of providing ecosystem services for the future. The 831 acres (29%) of NFS land in Hile and Horseshoe Run watersheds considered unsuitable for timber production includes 271 acres of mixed-mesophytic forest and 45 acres of late successional stands. In the entire project area, there are 3,575 acres of mixed mesophytic forest unsuitable for timber production that will be maintained, approximately 10% of the NFS lands in the project area.

Effect: Vegetation management and associated activities, road construction and maintenance, and wildlife enhancements may affect non-native invasive species (NNIS) propagation and establishment

This section of the report discloses effects of the project on nonnative invasive species (NNIS) of plants. This report does not address non-native invasive invertebrates and pathogens, as they are generally not considered to be a problem in the project area at this time.

The spatial boundary of the analysis is the project area boundary and the temporal boundary is 30 years. This time period should allow ample time for completion of the control activities that are needed to mitigate potential spread of invasive plants due to project activities. It should also encompass the time period needed for redevelopment of a forest canopy over disturbed sites such as skid trails, which should greatly reduce any shade-intolerant NNIS that become established in these disturbed areas.

Table 26. Nonnative Invasive plants (common names) found in 2021 surveys and commonly occurring NNIP's in historic records in the project area (* = High priority species; H = Historic record)

Garlic mustard*	Amur honeysuckle* - H	Fuller's teasel - H
Japanese barberry*	Queen Anne's lace - H	Canada thistle - H
Japanese stiltgrass*	Autumn olive	Reed canary grass - H
Morrow's honeysuckle*	Tall fescue - H	Oxeye daisy - H
Meadow knapweed* - H	Bald brome - H	Kentucky bluegrass - H
Multiflora rose - H	Chinese Yam* - H	Nodding plumeless thistle - H
Lesser burdock - H	Tree of heaven*	Crown vetch*
Wineberry*	Mugwort	Common periwinkle*
Japanese knotweed*	Bull thistle - H	Canada bluegrass – H

Commercial timber harvest and associated skid trail and landing construction and use have the potential to actively spread and/or facilitate the natural spread of NNIS (Mortensen et al., 2009). Log skidders and construction equipment can act as a vector to transport invasive seed onto skid trails and landings. Also, tree harvests can facilitate the natural spread of invasive plants by opening the midstory and overstory canopies and removing other natural vegetation, which would increase the amount of light and other resources available for invasive plants. For both direct spread and indirect spread, the potential is greatest in activity areas that are near existing infestations, which would provide a pre-existing seed

source. However, invasions could occur in other areas due to long-distance seed dispersal via log skidders, contaminated seed and mulch, and other natural means (e.g. birds and wind).

The risks posed by commercial timber harvest would be reduced by tiering to the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment. Measures included in the proposed action (using weed-free seed mixtures, restricting the use of hay as mulch, and cleaning equipment) should reduce the risk of new or expanded invasions, but are not likely to completely eliminate the risk of NNIS establishment and spread. If these actions fail to prevent new or expanded infestations from becoming established in harvest units, the persistence of such invasions likely would vary by species. Shade-intolerant low priority species probably would spread and persist until the tree canopy closes back over the harvest units. Some of these species can persist under a closed canopy indefinitely, but they do not produce fruit and spread under such conditions. Other species die out once the canopy closes. Shade-tolerant, high priority species, however, are likely to persist and spread unchecked, even after the tree canopy closes. Unchecked spread of these species can lead to a loss in biodiversity (Vila et al. 2011, Pyšek et al., 2012, Simberloff et al., 2013) and become impractical, if not impossible, to control if left unchecked for extended periods of time (Fleming et al. 2017).

Timber harvest site preparation activities would include control of understory vegetation through soil spot grid, foliar spray, spot foliar spray, and cut surface. Although invasive plants would not be the primary target of site preparation, these activities would have the potential to control existing infestations of invasive plants to some degree. Because of its extensive coverage in the stands where it is applied, foliar spray application would be the most likely site preparation activity to reduce or control invasive plants in the short-term. However, the additional sunlight and reduction in native vegetation could potentially benefit invasive plants due to reduced competition of native flora coupled with the disturbance activities that follow site-preparation herbicide.

Site preparation likely would not completely eradicate existing infestations because it would not include follow-up monitoring and treatment. Site preparation activities also may present some risk of spreading invasive plants due to the use of spray vehicles for foliar spray herbicide application. However, such vehicles would be required to be clean when they arrive at the project site, therefore reducing risk.

Skid trail construction, soil restoration activities, and timber landings would have the potential to spread invasive plants via contaminated equipment, mulch, seed, and gravel on the bare ground resulting from activities. Tiering to the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment would allow treatment of existing infestations, which would reduce the chances that new NNIS would become established or existing infestations would expand. As treated legacy features and skid trails revegetate, they would be less vulnerable to new invasions.

Riparian and stream habitat enhancements would have a low risk of spreading invasive plants. These activities involve felling scattered individual trees and would not require the use of heavy equipment, mulch, or seed, which would present a very limited risk of invasion. Workers accessing the sites on foot present a limited risk of spreading invasive plants via seeds stuck to clothing and boots. Where a seed source is available or infestations currently exist, the partial canopy openings created by stream habitat enhancement could facilitate invasions by opening niche space for invasive plants to exploit. For example, Japanese stiltgrass, although considered shade-tolerant, tends to invade areas that have sunflecks coming through the canopy and is readily spread via vehicle tires (Cole and Weltzin 2005, Mortensen et al. 2009). Management in these areas could result in limited control of woody invasive plants. If any woody invasive plants are present in treatment units, they could be cut or killed with herbicides to release desirable native trees by tiering to the NNIS EA.

Other ongoing activities not included in the proposed action may contribute to the spread of invasive plants. These activities include continued recreational use of NFS land, particularly motorized travel on forest roads, horseback riding, and unauthorized off-highway vehicle use; maintenance of roads that are open to public travel; operation and maintenance of facilities and roads that are associated with utilities; and activities on private lands such as timber harvest, road construction, and residential and agricultural development.

Nonnative invasive plant control would reduce the risk of other project activities spreading invasive plants. Existing infestations in or near proposed activity areas would be controlled through spot applications of herbicides. Any new or expanded infestations that occur due to project activities would also be subject to such control. Areas identified during Summer 2021 surveys as having NNIS have been tiered to the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment through a Review of New Information (RONI) process and will be added to the herbicide treatment schedule. Although control may not be completely successful, follow-up monitoring and control would increase the likelihood of eventual eradication. Removal of dense infestations of invasive plants would leave open growing space that could potentially release or be colonized by other invasive species.

Specific information on the introduction and spread of NNIS plants due to activities in the distant past and activities on private land is not available. However, the current distribution of invasive plants in disturbed areas strongly indicates that these activities were collectively responsible for the introduction and spread of existing infestations. Private lands are especially influential in terms of spread and establishment of NNIS in the Upper Cheat project area due to fragmentation of ownership and the fact that 61% of the project area is privately owned. Information on the extent, spread, and treatment of NNIS infestations are not known for adjacent private lands, but it is likely that numerous NNIS are present. Private lands adjacent to NFS land could serve as a constant seed source for new infestations if those areas are left untreated, especially since ground disturbing activities, such as timbering or road construction, are high risk activities for spreading seed through mechanical equipment. Whenever the Forest becomes aware of NNIS infestations on bordering private lands, we can pursue opportunities for agreements to treat NNIS across ownership boundaries and, as we have done with infestations on NFS land, tier to the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment to reduce spread. Despite the potential impact of private lands on NNIS populations, tiering to the forest-wide NNIS EA would allow the proposed action to reduce the potential for a large cumulative increase in infested land.

Table 27. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Ecology/Botany Specialist Report	UCR_BotanyEcologySpecialReport_20211227

Hydrology and Aquatics Resources

Effect: Vegetation removal may affect watershed hydrology

Vegetation removal can affect watershed hydrology through altered evapotranspiration processes which can lead to changes in low and high flow conditions in streams. Streamflow can increase as a result of vegetation removal (Eisenbies et al., 2007; Crampe et al., 2021; Zhao et al., 2021). Approximately 20-25% of a watershed basal area needs to be removed before a significant increase in flows due to harvesting can be detected (Stednick, 1996; Kochenderfer and Hornbeck, 1999; Kuras et al., 2012). These levels of harvest can result in increased stormflows for small to medium events, but the relative contribution of vegetation removal to flood peaks decreases as storm events become larger (Eisenbies et al., 2007; Kuras et al., 2012; Bathurst et al., 2020).

Following harvest, streamflow increase is most pronounced during low-flow conditions during the growing season and effects diminish subsequently each year, returning to pre-harvest flows typically within 5-15 years with some longer recovery periods documented (Eisenbies et al., 2007; Buttle et al., 2018; Crampe et al., 2021). In eastern hardwoods, there is often an initial increase in base flow followed by a decrease as evapotranspiration increases when young trees have higher water demands (Jones and Post., 2004). Harvests of less than 10-15% in a catchment within one year generally result in undetectable streamflow changes and a quick return to pre-harvest hydrology. However, if multiple harvests in a catchment overlap within a 1-3 year timeframe and approach the 20-25% threshold of vegetation removal, storm flows can increase to volumes which would change stream channels by scouring and incision. These changes to the channel would perpetuate far longer than the altered hydrologic response (Kuras et al., 2012). The location of harvest within a catchment also influences water yield and the potential for altered

streamflow, i.e. harvest units further from flow paths would have less influence on water yield at the catchment-scale (Zhao et al., 2021).

Research studying the effects of timber harvests on hillslope hydrology indicate that roads and skid trails have a greater influence on runoff than vegetation removal (Eisenbies et al., 2007; Alila et al., 2009; Bates et al., 2015; Buttle et al., 2018; Zhao et al., 2021). However, changes to runoff from roads and vegetation removal interact with each other. Given this interaction, the effect of vegetation removal is independently analyzed at the catchment scale as well as within the context of the road network.

At the project and watershed-scale, vegetation removal does not approach thresholds expected to result in detectable changes to water quantity dynamics (Table 28). Based on previous timber harvests at the catchment-scale, only one catchment (Thunderstruck Run) exceeds the threshold of significant altered hydrology from vegetation removal (Table 29). The proposed timber harvest unit in this catchment is 29 acres or 1% of the catchment. Of 763 acres harvested in this catchment in the recent past, the harvests have been spread out from 2016 to 2020. Each year following the harvest, increased water demands from regrowth in one unit begin to off-set water surpluses from a unit harvested in the current year. Therefore, this assessment by catchment is a conservative approach unless all harvest units within one catchment are harvested in the same year or within a few years of each other. Based on the ownership pattern in Thunderstruck Run with private harvests dominating the headwaters, the location of the proposed unit near the downstream section of the catchment, and the limited acreage addition of the proposed action, significant effects from this timber harvest unit are not expected. Because the layout of harvest units were planned with consideration of hydrologically sensitive areas and also incorporate stream buffers that provide additional water storage capacity, vegetation removal in harvest units or unit clusters would not cause significant impacts to hydrology.

Table 28. Timber harvest by project area and 6th level HUC watersheds

Area	Project	Harvest Acres	Percent of Watershed
Upper Cheat River Project Area (86,138 acres)	Upper Cheat River	3,676	4.3%
	Lower Clover	467	0.5%
	Hogback	1,448	1.7%
	Private harvests	5,184	6.0%
	Corridor H Highway	291	0.3%
Total per watershed			12.8%
Horseshoe 6th level watershed (35,282 acres)	Upper Cheat River	1,553	4.4%
	Hogback	1,200	3.4%
	Private harvests	2,777	7.9%
Total per watershed			15.7%
Clover 6th level watershed (18,926 acres)	Upper Cheat River	1,105	5.8%
	Lower Clover	282	1.5%
	Hogback	0	0.0%
	Private harvests	579	3.1%
Total per watershed			10.4%
Licking Creek 6th level (10,408 acres)	Upper Cheat River	389	3.7%
	Lower Clover	127	1.2%
	Hogback	0	0.0%
	Private harvests	582	5.6%
Total per watershed			10.5%
Minear Run 6th level (21,377 acres)	Upper Cheat River	629	2.9%
	Lower Clover	58	0.3%
	Hogback	248	1.2%
	Private harvests	1,246	5.8%
	Corridor H Highway	291	1.4%
Total per watershed			11.6%

Table 29. Timber harvest by catchments

Catchment	Catchment Acres	Proposed Harvest Acres	Proposed Harvest % of catchment	Forest Service harvests from 2006 to 2021 (acres)	Private harvests from 2016 to 2021 (acres)[7]	Past harvest public/private percentage of catchment	Past private with Proposed Action (%)
Cheat River mainstem	13,043	186	1.4%	135	1,210	10.3%	10.7%
Dry Run	1,554	74	4.8%	23	0	1.5%	4.8%
Hobson Run	1,418	124	8.7%	0	0	0.0%	8.7%
Indian Run	3,498	129	3.7%	0	236	6.7%	10.4%
Leadmine Run	3,954	0	0.0%	87	319	10.3%	8.1%
Lower Hile	767	36	4.7%	35	0	4.6%	4.7%
Lower Horseshoe	2,157	132	6.1%	16	0	0.7%	6.1%
Lower LF Clover	2,311	163	7.1%	120	0	5.2%	7.1%
Lower Licking	3,292	75	2.3%	0	0	0.0%	2.3%
Lower RF Clover	1,962	138	7.0%	139	0	7.1%	7.0%
Middle Horseshoe	4,231	367	8.7%	200	236	10.3%	14.3%
Middle LF Clover	4,471	301	6.7%	13	40	1.2%	7.6%
Mike Run	2,571	213	8.3%	0	25	1.0%	9.3%
Mill Run	3,642	104	2.9%	204	364	15.6%	12.9%
Minear Run	6,989	248	3.5%	0	362	5.2%	8.7%
Panther Run	2,003	202	10.1%	0	92	4.6%	14.7%
Thunderstruck	3,004	29	1.0%	53	710	25.4%	24.6%
Tobes Run	723	36	5.0%	0	100	13.8%	18.8%
Upper Hile	1,900	140	7.4%	145	188	17.5%	17.3%
Upper Horseshoe	7,430	141	1.9%	249	943	16.0%	14.6%
Upper Jonathan	999	76	7.6%	110	0	11.0%	7.6%
Upper LF Clover	3,073	193	6.3%	0	47	1.5%	7.8%
Upper Mid Horseshoe	4,331	241	5.6%	233	115	8.0%	8.2%
Upper RF Clover	1,486	67	4.5%	0	64	4.3%	8.8%
Wolf Run	4,971	264	5.3%	153	424	11.6%	13.8%

[7] Includes Corridor H highway harvests on public and private land

Canopy vegetation removal may also affect soil water temperature both onsite and at a broader scale (Keenan and Kimmins, 1993; Taniguchi et al., 1999; Clinton, 2003; Özkan and Gökbulak, 2017; Boehnke, 2021). Canopy opening size and shape influence the amount of solar radiation, which can potentially increase soil temperature and water temperature (Carlson and Groot, 1997; Boehnke, 2021). These effects generally only last until vegetation has regrown to the point of shading the soil. Because the majority of groundwater is relatively shallow on the Monongahela National Forest, effects on soil water may be elevated. Increased soil water temperature can increase stream water temperature. Aquatic organisms have limited to no ability to move away from systemic temperature stresses.

Most studies have focused on stream temperature effects of removing riparian vegetation. Of the few that have evaluated the effect of vegetation removal on stream temperatures with riparian buffers in place, the results indicate general recovery from localized increases in soil temperature at the watershed scale. This is likely driven by increased streamflow volumes or overridden by deeper groundwater influences (Tague et al., 2007; Kibler et al., 2013; Groom et al., 2017; Bladon et al., 2016 and 2018). Because shallow subsurface water primarily drives streamflow in project area streams, further consideration should be given in catchments or watersheds with a higher percentage of vegetation removal, especially where temperature monitoring indicates coldwater criteria are already approaching thresholds (Kurylyk et al., 2015).

In a comparison between previously harvested and unharvested catchments in the project area, controlling for climate-associated air temperature increases, there was little discernable difference in expected stream temperatures in relationship to vegetation removal. Maxwell Run had the greatest increase in average water temperature. Controlling for air temperature increases, the absolute increase in average water temperature is approximately 1°C while maximum temperature did not increase. Further analysis of this catchment reveal the increase is likely driven by the clearcut of 196 acres at the top of the catchment on private lands without adequate stream buffers and skid trails crossing the stream in numerous locations. These findings are consistent with paired watershed studies indicating skid trails and inadequate buffers as the primary cause of elevated stream temperatures (Clinton, 2011; Bladon et al., 2018; Erdozain et al., 2018). Since proposed harvest in Maxwell Run doesn't require skid trail construction (i.e., helicopter logging) it is not anticipated that stream temperature will increase as a result of the proposed action. These effects are mitigated in other catchments as a result of the avoidance of skid trail construction or post-harvest enhanced restoration of skid trails (Witt et al., 2016).

Effect: Roads and skid trails may affect watershed hydrology, sediment processes, and stream temperatures. Effects may be greater on steep and very steep slopes.

Roads increase the risk of negative effects to watershed resources by two primary mechanisms: (1) road cuts and road surfaces intercept groundwater and precipitation; and (2) compacted road surfaces and ditches concentrate flow and accelerate water movement downslope (King and Tennyson, 1984; Jones et al., 2000; Gucinski et al., 2001; Cuo et al., 2008; Soulis et al., 2015). Potential negative effects may continue by secondary mechanisms which include head-cutting, gully formation and surface erosion, fill-slope loss, stream crossing erosion, stream sedimentation, elevated water temperature, and reduced site productivity (Gucinski et al., 2001; Tague and Band, 2001; Wemple and Jones, 2003).

Sediment production and movement following road construction and maintenance is more likely in the short term (one to two years), sharply drops off after this period, and continues for the life of the road commensurate with condition and use (Wang et al., 2010, Gucinski et al., 2001; Orndorff, 2017). Effects to hillslope hydrology typically continue for the life of the road and the magnitude of those effects are primarily related to the amount of groundwater interception, road surface compaction, connection of road networks to stream channels, and slope (Wemple and Jones, 2003; Soulis et al., 2015). Prevention and disruption of concentrated flows (e.g., stream crossings, swales, gullies, or road ditches without frequent drainage) can reduce the extent of sedimentation and hydrologic alteration. The concentration of flow associated with roads increases the risk of sediment breaking through areas of potential recovery (e.g., riparian buffer zones, sections of forest between roads) where sediment may be captured and water can re-infiltrate into the soil (EPA, 2010).

The impact of forest roads on catchment and watershed-scale hydrological processes have been well documented, particularly for flood dynamics (Jones and Grant, 1996; Jones et al., 2000; Wemple and Jones, 2003). Roads increase the magnitude and frequency of peak flows by intercepting, redirecting, and accelerating surface and shallow groundwater (Jones and Grant, 1996). Improvements to road design or decommissioning treatments can mitigate these effects.

Studies have widely documented that BMP implementation reduces the short-term sedimentation risk associated with road creation (Kochenderfer and Hornbeck, 1999; Cristan et al., 2016; Orndorff, 2017). Forest BMP monitoring has documented instances where WV BMPs have failed to fully achieve the intended protection of aquatic resources. Beyond WV BMPs, this project proposes enhanced treatment (e.g., decompaction, recontouring) on new skid trails when field observations indicate impaired recovery of hydrologic function, poor soil quality, or slopes greater than 40%. Sections of NFS roads causing excessive sedimentation and groundwater interception, would be treated to improve conditions, reducing the overall system road mileage by 2.1 miles.

Though the mileage of new skid trail creation/treatment (49 miles) nearly equals the mileage of soil restoration activities on existing linear features (50 miles), a simple “old” to “new” skid road comparison is not accurate. A portion of the skid trails classified as “new” are actually existing linear features on the landscape that would be used in timber operations and subsequently treated. They are not counted in the 50 miles of proposed soil restoration activities on existing linear features. Treatment of existing features would address existing hydrological impairment, while new skid trails would be treated with BMPs or enhanced treatments as conditions dictate. Existing linear features proposed for treatment are those identified as having greater influence on watershed scale hydrology as evidenced by proximity to streams, indicators of erosion and groundwater interception, and location on steep slopes or sensitive soils. Cumulatively, the proposed action is expected to increase groundwater infiltration, decrease concentrated flow paths, reduce erosion, and decrease water temperatures in comparison to the existing road and trail network.

New skid trails in the project area represent a relatively low risk for negative effects to watershed processes and aquatic resources due to project planning to avoid most sensitive areas (steep slopes, cove positions, wet soils, etc.) and post-harvest restoration. Areas of steep and very steep slope inclusions exist in some of the ground-based timber units. These areas were evaluated in the field and through GIS to determine their extent and size as it relates to potential equipment operations and stability. These steeper areas were determined to either be narrow enough to avoid direct equipment operation by removing timber from above or below the steep areas (e.g., R128, T134) or are in areas with stable existing linear features that can be used for the harvest and recontoured after harvest (e.g., R121, R127). Potential effects in the interim between trail creation and treatment are likely to be localized because harvest units were laid out within the framework of avoiding hydrologically sensitive areas. It is expected that the risk of measurable effects to watershed processes and aquatic resources would be limited in extent, duration, and magnitude, making the likelihood of quantifiable changes to these resources at the catchment scale low.

Effect: The use of herbicide may impair water quality

All herbicides proposed for use in this project were evaluated under the 2010 Forest-wide Nonnative Invasive Plant Management Project Environmental Assessment. Effects to aquatic resources and potential risk to the general public from water quality impairment were analyzed in the 2010 document. A comparison between environmental conditions outlined in the Forest-wide EA and this project do not reveal unique considerations for analysis (soil type, geology, treatment within buffers etc.). As a result of design features and mitigations of the Forest-wide EA and this project’s alteration of a timber unit to avoid herbicide application within the watershed of a landowner’s spring source, effects on human health or the aquatic environment are not expected.

Effect: Watershed restoration activities may provide improvements to watershed processes, aquatic habitat, and aquatic organisms

Aquatic habitat connectivity is expected to increase as a result of the proposed action which includes improvement of all 15 road-stream crossings in the project area on NFS roads that are impairing fish movement or stream channel conditions. Short-term sedimentation may result from replacing or removing structures, but application of BMPs should reduce sedimentation and result in long-term improvements.

Limited opportunities to improve riparian conditions on NFS lands exist within the project area, as most are forested and are properly functioning or trending towards it. Areas with limited riparian canopy coverage or inadequate buffer width are proposed for increased buffer width and planting. Large woody material supports healthy riparian conditions. Most of the natural wood recruitment from 2012 storm events continues to provide the desired ecosystem function. However, large woody material in some stream channels, particularly larger systems (e.g., Left and Right Forks of Clover Run, Horseshoe Run, Indian Run), have not been maintained and have become incised. These actions are expected to improve in-stream habitat, reduce erosion, reconnect streams to floodplains, and further enhance riparian conditions (Flebbe and Dolloff, 1995; Lassettre and Harris, 2001) in areas lacking large woody material and stream channel stability.

Proposed NFS road decommissioning and soil restoration activities on existing linear features would eliminate numerous sources of soil erosion and hydrologic impairment currently contributing to long-term impairment of the aquatic ecosystem in the analysis area. Road and existing linear feature treatments require ground disturbance, but sediment production is localized and erosional processes do not travel beyond the work area. These actions improve hillslope hydrology by increasing groundwater infiltration and storage, reducing concentrated flow paths, slowing water movement downslope, and reducing water temperatures (Switalski et al., 2004; McCaffery et al., 2007; Lloyd et al., 2013). This work, along with treatments of new skid trails, would reduce the overall mileage of NFS roads and existing linear features and focus improvements in areas expected to provide a larger impact. Long term benefits to watershed processes are expected from these actions.

Effect: Climate change may continue to increase stress on coldwater aquatic communities through increased temperatures and more extreme weather events, interacting with other effects cumulatively

A Central Appalachian meta-analysis indicates climate change is likely to affect stream temperature, flood flows, and drought intensity and frequency throughout the region (Butler et al., 2015). Projected increases in air temperatures for the area are expected to be substantial enough to both directly and indirectly affect watershed processes and aquatic biota, particularly brook trout. More conservative models indicate air temperature increases of 1-3° F (0.5-1° C) in the next fifty years for the region, while less conservative models indicate increases of 7-10° F (3-5° C) for the same timeframe and area (Butler et al., 2015). Temperature increases of this magnitude would directly compromise the integrity of the coldwater ecosystems in the project area, with the lower predicted increases likely leading to partial extirpation of brook trout and the more extreme predictions leading to complete extirpation from the analysis area. A technical report specific to the Upper Cheat watershed analyzed temperature and hydrology trends in Preston and Tucker Counties since 1970 and concluded air temperatures have already increased approximately 1.5°C and annual precipitation has increased by 4.2 inches (NASA, 2021). Furthermore, the change in precipitation is represented by flashier flows with more frequent flood peaks and more pronounced and prolonged droughts. This analysis also concluded the primary driver of these effects was climate change and as opposed to land use change (e.g., urbanization, timber harvest, etc.).

The correlation between air temperature and stream temperature increases is not linear; i.e., air temperature may increase with or without a 1:1 increase in stream temperature. All seven monitoring sites in the project area with multiple years of data show that average and maximum stream temperatures and the number of days above critical thresholds have increased (Table 30). Stream temperature is less likely to increase with protective measures and proactive management which should increase the resiliency and resistance of the watershed to climate change. This could include soil restoration on roads and

existing linear features, large woody material additions to streams, and riparian buffer protection and planting (Palmer et al. 2009). These activities decrease stream temperature by keeping water shaded, underground, or in pools by reducing solar radiation, increasing stream-groundwater connectivity, and slowing the flow of water down the hillslope and through the stream network and increase resistance to drought and floods by slowing water movement through the watershed and increasing the storage volume both in subsurface flow and in-stream pool habitat (McCaffery et al. 2007; Palmer et al. 2009).

Table 30. Water temperature monitoring results (in degrees Celsius)

Stream (Elevation)	Month /Day	Year	Min	Avg	Max	Max 24-hr Min	Max 24-hr Avg	Max 24-hr Max	Avg above 18C (days)	Max above 22C (days)	Max above 25C (days)
Clover Run - Left Fork (1600 feet)	6/14-10/3	2006	11.6	17.4	23.3	20.3	21.6	23.3	47	5	0
	6/10-10/23	2016	11.3	18.6	23.7	22.0	22.7	23.7	90	25	0
	6/9-10/7	2020	9.5	18.5	23.8	21.4	22.4	23.8	86	23	0
Clover Run - Right Fork (1600 feet)	6/14-10/3	2006	9.6	16.9	23.0	21.0	21.9	23.0	37	3	0
	5/25-10/18	2017	8.6	16.5	21.6	19.8	20.3	21.6	37	0	0
	6/9-10/8	2020	8.5	17.7	22.7	21.3	21.9	22.7	78	9	0
Clover Run - Left Fork, upper (1960 feet)	6/14-10/3	2006	9.8	16.1	21.9	20.2	21.0	21.9	26	0	0
	6/3-10/7	2014	8.1	16.3	22.2	18.4	19.9	22.2	31	2	0
	5/29-10/14	2019	10.0	16.6	21.3	19.5	20.4	21.3	43	0	0
Hobson Run (2020 feet)	6/14-10/3	2006	10.5	15.9	20.8	18.9	19.8	20.8	13	0	0
	6/12-10/27	2015	8.1	15.5	18.7	18.1	18.3	18.7	4	0	0
	6/10-10/7	2020	9.2	16.6	20.9	19.3	19.7	20.9	39	0	0
Hile Run (1890 feet)	6/11-10/1	2006	9.7	15.9	21.0	19.7	20.4	21.0	19	0	0
	6/12-10/27	2015	6.3	15.9	21.1	19.0	20.0	21.1	37	0	0
	6/9-10/5	2020	8.3	17.0	22.1	19.9	20.8	22.1	48	2	0

Stream (Elevation)	Month /Day	Year	Min	Avg	Max	Max 24-hr Min	Max 24-hr Avg	Max 24-hr Max	Avg above 18C (days)	Max above 22C (days)	Max above 25C (days)
Maxwell Run (1670 feet)	6/11-10/1	2006	9.9	15.8	20.6	19.5	20.0	20.6	14	0	0
	6/13-10/20	2013	8.9	15.9	21.6	19.4	20.4	21.6	21	0	0
	5/30-10/10	2018	10.9	17.5	21.8	19.5	20.4	21.8	56	0	0
Mike Run (1660 feet)	6/30-9/30	2009	13.6	16.1	18.6	17.9	18.2	18.6	2	0	0
	6/13-10/14	2010	11.2	17.0	19.3	18.7	19.0	19.3	25	0	0
	6/28-10/9	2011	10.0	16.6	20.0	19.5	19.7	20.0	29	0	0
	6/1-10/5	2012	11.3	16.4	19.5	18.6	18.9	19.5	32	0	0
	6/13-10/20	2013	11.5	15.9	20.2	19.6	19.9	20.2	18	0	0
	6/3-10/7	2014	11.0	16.5	20.2	19.0	19.6	20.2	27	0	0
	6/12-10/18	2015	11.1	20.0	20.0	19.3	19.6	20.0	32	0	0
	5/30-10/14	2019	11.3	17.0	21.3	19.9	20.5	21.3	47	0	0
	6/10-10/5	2020	10.9	17.0	20.5	19.3	19.7	20.5	45	0	0
Minear Run (1800 feet)	6/23-10/2	2007	9.3	16.1	23.5	18.4	19.2	23.5	2	0	0

Climate change effects on hydrology result in increased stress on aquatic biota as floods and droughts directly stress individual organisms, reduce reproductive success, and alter habitat which influences survival and reproduction (Williams et al., 2015; Austen et al., 2016). Droughts and increased air temperature magnify water temperature increases and reduce oxygen levels (Brooks, 2009; Palmer et al., 2009). Given baseline temperature conditions meet or exceed critical temperature thresholds for coldwater aquatic biota throughout the project area, additional increases from climate change are highly likely to shift the structure of aquatic ecosystems in the area and reduce the potential for coldwater dependent species to remain viable. Proposed actions to improve watershed function may mitigate some of these effects.

Effect: Alterations to water quality, quantity, and aquatic habitat may pose a risk to aquatic RFSS and MIS

Aquatic organisms are responsive to biological, physical, and chemical changes to their environment. The two primary risks associated with the proposed action are changes to water temperature and sedimentation, which can be generalized for all RFSS and MIS aquatic species because they share the same environment and are largely subject to changes in these conditions homogeneously. Generally, the species most sensitive to an environmental stressor is used as a surrogate for the aquatic community.

Brook trout are considered an excellent indicator species in regard to temperature and sediment. They have the lowest temperature sensitivity and sedimentation thresholds of the six RFSS and MIS that may

occur in the analysis area (Newcombe and Macdonald, 1991; Curry and MacNeill, 2004; Edwards et al., 2007; Meador and Carlisle, 2007) Decreases in brook trout occurrence and abundance in the project area (Table 31) indicate temperature and hydrologic alteration as the primary causation for these declines, given the relative stability and amount of stream habitat improvement that has occurred over the last 10-15 years. Hobson Run, the highest elevation and coldest stream monitoring site, is the only stream with multiple years data in which brook trout populations have remained stable. Data from several monitoring sites (e.g., Maxwell Run, Mike Run, upper Left Fork Clover Run) indicate a near extirpation of brook trout. For example, upper Left Fork Clover Run documented 18.9 pounds/acre in 2008, 9.9 pounds/acre in 2014, and 0.1 pounds/acre in 2019. Brook trout decline is highly likely to continue in the analysis area given documented and predicted changes in climate. Proposed watershed actions should improve resiliency related to water temperature and altered hydrology associated with climate change and the potential effects on brook trout.

Table 31. Aquatic Ecological Unit Inventory sites and fish data within the project area. Dashed lines represent the derecho and Superstorm Sandy event occurrences.

Stream	Sample Date	Brook Trout (lbs/ac)	Brown Trout (lbs/ac)	All Species (lbs/ac)
Hile Run	7/16/2009	12.6	0.0	74.8
	8/26/2015	20.0	0.0	64.2
	6/29/2020	7.3	0.0	23.2
Maxwell Run	7/9/2007	14.0	0.0	54.6
	9/9/2013	1.2	0.0	66.0
	7/31/2018	0.0	0.0	9.0
Mike Run (Horseshoe)	6/6/2006	7.3	0.0	42.4
	6/21/2012	24.3	0.0	68.8
	8/31/2017	0.1	0.0	30.3
Clover Run - Left Fork, lower	6/29/2010	0.0	0.0	13.5
	8/9/2016	0.0	0.0	20.8
	7/28/2020	0.0	0.0	3.9
Clover Run - Left Fork, upper	8/14/2008	18.9	0.1	60.0
	8/6/2014	9.9	0.0	19.7
	6/20/2019	0.1	0.0	11.7
Clover Run - Right Fork	6/7/2010	0.0	0.0	6.7
	8/15/2016	1.3	0.0	31.5
	8/3/2020	0.0	0.0	1.6
Hobson Run	7/8/2009	12.8	0.0	23.1
	8/27/2015	2.3	0.0	4.7
	6/15/2020	9.8	0.0	19.8
Panther Run	7/14/2011	1.8	0.0	1.9
	8/1/2017	5.9	0.0	7.3

Sediment smaller than one millimeter is the most stressful for aquatic organisms (Edwards et al., 2007). It fills and seals gaps between spawning gravel, reduces interstitial space for macroinvertebrates and eggs, and interrupts oxygen exchange. Monitoring data in catchments with little to no public or private timber harvest acreage (e.g., Hobson Run, Mike Run) and in catchments with more harvest acreage (e.g., Hile Run) document a general increase in sediment less than 4 millimeters in spawning gravel samples, but relative stability in the levels of sediment less than 1 millimeter (Table 33), indicating that recent timber harvest activities have not negatively affected sedimentation. The disparity is likely explained by the influence of large wood recruitment from 2012 storm events. Large wood mobilizes and sorts larger streambed particles and also facilitates the storage of fine sediment and reduces erosion at the catchment scale (Lassettre and Harris, 2001). Timber operations typically mobilize sediments smaller than one millimeter, which is often captured by stream buffers. This may explain the increase in one-to-four-millimeter sediment levels and stable one millimeter sediment levels. The proposed action is not expected to adversely affect aquatic organisms through altered sediment dynamics. The distribution of timber harvests across the project area, layout of timber units to avoid hydrologically sensitive areas, improvements to the overall road and skid trail network to increase groundwater infiltration, and riparian buffers all decrease the likelihood of temperature changes driven by vegetation removal.

This analysis relied on brook trout as a more sensitive indicator of watershed effects. Brook trout are found further upstream in headwater streams (e.g., 1st and 2nd order streams) and closer to proposed actions; therefore, potential risk to aquatic RFSS occurring downstream (e.g., 3rd order and higher streams) is expected to be less than for brook trout. Aquatic RFSS are less sensitive to water temperature stress and are equal or less sensitive to sedimentation than brook trout; therefore, for all aquatic RFSS the proposed action may impact individuals but is not likely to cause a trend toward federal listing or a loss of viability. Climate change is expected to be the primary cause of brook trout declines in the analysis area. Proposed actions to improve watershed function may mitigate some of these effects.

Table 32. Aquatic Ecological Unit Inventory sites and stream habitat conditions within the project area. Dashed lines represent the derecho and Superstorm Sandy events.

Stream	Sample Date	Channel Type	Bankfull (m)	Riffle	Run	%Fast	Pool	Glide	%Slow
Hile Run	7/16/2009	F4	11.35	55.9	0.0	55.9	18.4	25.7	44.1
	8/26/2015	F4	14.00	20.1	0.0	20.1	33.8	46.1	79.9
	6/29/2020	B4c	8.90	57.5	9.9	67.3	14.4	18.3	32.7
Maxwell Run	7/9/2007	F3b	8.30	80.6	0.0	80.6	19.4	0.0	19.4
	9/9/2013	B4	8.80	56.2	16.9	73.1	26.9	0.0	26.9
	7/31/2018	B4	10.25	87.6	6.1	93.7	6.3	0.0	6.3
Mike Run (Horseshoe)	6/6/2006	C4	9.80	54.4	22.2	76.6	23.4	0.0	23.4
	6/21/2012	C4b	9.10	39.9	0.0	39.9	60.1	0.0	60.1
	8/31/2017	F3	7.20	46.2	0.0	46.2	51.2	2.6	53.8
Clover Run - Left Fork, lower	6/29/2010	C4	23.10	37.4	0.0	37.4	10.1	52.6	62.7
	8/9/2016	F3	18.80	37.7	0.0	37.7	55.3	7.0	62.3
	7/28/2020	F3	21.40	58.7	0.0	58.7	0.0	41.3	41.3
Clover Run - Left Fork, upper	8/14/2008	F3b	8.10	76.2	10.0	86.2	13.8	0.0	13.8
	8/6/2014	B4	12.90	73.8	3.7	77.5	18.1	4.3	22.4
	6/20/2019	B4c	8.50	68.0	20.4	88.4	11.6	0.0	11.6
Clover Run - Right Fork	6/7/2010	C4	15.20	64.7	35.3	100.0	0.0	0.0	0.0
	8/15/2016	C3	18.80	83.8	0.0	83.8	16.2	0.0	16.2
	8/3/2020	C3	12.50	61.4	0.0	61.4	38.6	0.0	38.6
Hobson Run	7/8/2009	F3b	7.20	78.0	0.0	78.0	16.8	5.2	22.0
	8/27/2015	C4b	8.30	77.8	0.0	77.8	18.2	4.0	22.2
	6/15/2020	F3b	6.70	56.2	3.4	59.6	20.7	19.7	40.4
Panther Run	7/14/2011	C4b	15.50	63.7	0.0	63.7	36.3	0.0	36.3
	8/1/2017	C3b	8.70	80.5	0.0	80.5	0.0	19.5	19.5

Table 33. Aquatic Ecological Unit Inventory sites and stream habitat conditions within the project area. Dashed lines represent the derecho and Superstorm Sandy events.

Stream	Sample Date	Residual Pool Depth	Instability[8]	Riffle Stability Index	Fines % less than 4 mm	Fines % less than 1 mm	Cover[9]	Large Woody Material[10]
Hile Run	7/16/2009	0.35	R	97.3	19.3	6.2	P	M
	8/26/2015	0.45	R	99.8	30.7	5.6	P	A
	6/29/2020	0.47	R	93.1	43.3	6.2	F	M
Maxwell Run	7/9/2007	0.10	O	96.2	26.1	3.8	F	S
	9/9/2013	0.29	O	84.4	16.5	2.8	P	A
	7/31/2018	0.57	R	n/a	33.3	9.9	P	M
Mike Run (Horseshoe)	6/6/2006	0.45	C	97.9	6.4	2.1	P	M
	6/21/2012	0.40	C	100.0	14.1	3.6	P	M
	8/31/2017	0.55	O	90.8	30.2	7.0	F	S
Clover Run - Left Fork, lower	6/29/2010	0.31	C	99.6	6.9	2.0	P	S
	8/9/2016	0.50	O	100.0	14.6	5.2	P	M
	7/28/2020	0.13	C	98.4	11.5	3.3	P	S
Clover Run - Left Fork, upper	8/14/2008	0.45	O	96.5	27.7	8.4	P	S
	8/6/2014	0.35	O	99.0	39.8	16.0	G	A
	6/20/2019	0.33	O	98.2	39.2	9.0	P	M
Clover Run - Right Fork	6/7/2010	n/a	O	82.4	n/a	n/a	P	S
	8/15/2016	0.76	R	98.4	25.5	6.1	P	M
	8/3/2020	0.64	O	98.3	21.0	6.2	P	M
Hobson Run	7/8/2009	0.31	C	91.2	18.3	3.2	G	M
	8/27/2015	0.28	O	91.5	31.1	9.2	P	A
	6/15/2020	0.19	C	95.6	40.0	10.6	F	M
Panther Run	7/14/2011	0.42	R	77.8	2.7	0.5	P	S
	8/1/2017	n/a	O	72.4	21.9	4.3	G	A

[8] R = Rare, less than 5% of length; O = Occasional, 5% to 25%; C = Common, greater than 25%

[9] G = Good, greater than 30%; F = Fair, 15% to 30%; P = Poor, less than 15%

[10] A = Abundant, 3 or more pieces per 10 meters; M = Moderate, between 1 and 3 pieces per 10 meters; S = Scarce, less than 1 per 10 meters

Table 34. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Hydrology and Aquatics Specialist Report	UCR_SpecialistAnalysis_Watershed_12112021

Soil Resources

Effect: Road, skid trail, and landing construction and use may result in erosion, soil compaction, decreased soil productivity, and detrimental soil disturbance. Risk of these effects to the soil resource are increased in areas of steep slopes and wet and/or unstable soils.

Soil productivity is the capacity of a soil to function, to sustain plant productivity, maintain or enhance water and air quality, and support human and ecosystem health (USDA Forest Service, 2010). Monitoring has shown that some management actions, like skid trail construction and use, can accelerate soil losses through compaction, erosion, and exposure of low-productivity subsoil as growing medium (USDA Forest Service, 2021) This results in detrimental soil disturbance and decreased soil productivity that, without treatment, persists long-term (Page-Dumroese et al., 2021; Busse et al., 2021; Crawford et al., 2021).

Soil compaction negatively effects soil productivity because the increased density decreases infiltration and impedes root penetration, resulting in decreased herbaceous growth and increased runoff, erosion, and sedimentation (Busse et al., 2021; Crawford et al., 2021). Research has shown that three passes of heavy equipment results in a statistically significant increase in soil compaction (Williamson and Neilsen, 2000). Deep soil compaction frequently observed on roads, skid trails and landings recovers slowly (30+ years) if left to natural processes (Busse et al., 2021; Page-Dumroese et al., 2021). This means that soil compaction is more severe and continuous in areas that experience concentrated vehicle and heavy equipment use, such as skid trails (USDA Forest Service, 2021).

As described earlier, approximately 193 acres of soil disturbance would result from new skid trail and landing creation/use. Soil disturbance required to construct and/or use these features is expected to result in short-term erosion and compaction. Some discontinuous areas of soil compaction and decreased soil productivity may persist in the long-term on both new and existing landings.

WV State and Forest Service best management practices (BMPs) would be used on all skid trails utilized in this project area to reduce the risk of negative impacts during timber harvesting (USDA Forest Service, 2012; WVDOF, 2018). At close-out, all skid trails would be evaluated and if found to have impaired hydrologic function or soil quality, they would be treated with enhanced methods as outlined in the EA, as well as those on slopes >40%. Those getting recontoured, would effectively be returning topsoil (along with nutrient capitol) to the skid trail. Returning fill (and topsoil) to trails and roads helps maintain soil productivity because it is a better growing medium than the subsoil, promoting revegetation and decreased erosion. These actions would also mitigate any rutting incurred during implementation. This, in conjunction with proposed decompaction and outsloping, would help to reduce long-term detrimental soil disturbance and mitigate losses to soil productivity where skid trails were used.

Landings would be seeded and mulched post-harvest. Seeding and mulching, as outlined in WV BMPs, should help reduce erosion through establishment of vegetative cover. Long-term soil productivity losses from topsoil losses and deep soil compaction are expected on landings.

Effect: Wildlife habitat enhancements may result in erosion, soil compaction, decreased soil productivity, and detrimental soil disturbance.

All proposed wildlife habitat enhancements have the potential to result in erosion, compaction, rutting and soil productivity losses. Steep slopes throughout the project area increase the risk of negative impacts. Risk of rut formation and erosion is increased if activities occur during periods of soil saturation. Severe rutting is typically observed where equipment or vehicle use is concentrated.

Actions requiring more extensive and deeper soil disturbance would be expected to have a higher risk of negative impacts. Mowing does not require disturbance of mineral soil, but may still result in compaction, rutting and erosion. Mulching, disking, and the creation of wildlife water sources on existing linear features require a minimum disturbance of organic horizons and topsoil, resulting in erosion, compaction and soil productivity losses (Page-Dumroese et al., 2021). Savannah creation and wildlife opening expansion typically results in loss of organic horizons, displacement and/or mixing of topsoil and subsoil and soil compaction from repeated passes of heavy equipment and could be more likely to negatively impact the soil resource long-term.

Detrimental soil disturbance from these activities is expected to be dispersed in nature and unlikely to persist in the long-term. However, any areas of concentrated equipment or vehicle use may result in soil compaction and rutting, which is slow to recover without treatment, and would persist in the long-term. Table 35 outlines the maximum allowable rutting (5% of a management activity area, per Forest Plan standard SW06) for each proposed wildlife habitat enhancement (USDA Forest Service, 2011). The proposed actions are not expected to result in severe rutting that exceeds these acreages because rutting would be confined to access areas or areas of multiple passes.

Table 35. Wildlife habitat enhancements and corresponding acres of maximum allowable rutting per Forest Plan standard SW06

Wildlife Habitat Enhancement Action	Acres	Maximum allowable rutting (acres)
Mulching	33	1.6
Mowing	205	10.3
Disking	44	2.2
Savannah creation and wildlife opening expansion	29	1.5

Effect: Proposed vegetation management activities may compound effects of acidic deposition potentially resulting in changes to nutrient cycling and soil productivity.

During the past century, the Monongahela National Forest has received some of the highest acidic deposition rates in the nation (Jenkins, 2002; Elias et al., 2009; USDA Forest Service, 2011). The most commonly recognized type of acidic deposition is acid rain. High acid deposition rates, coupled with slow mineral weathering rates and inherently nutrient-poor and acidic geologies, has resulted in the majority of soils on the Monongahela National Forest having moderate to high acidic deposition risk (USDA Forest Service, 2011). Acidic deposition risk throughout the project area is rated as moderate.

Soils in the project area have limited stores of plant available base cations, including calcium which is essential to healthy tree growth (Johnson and Todd 1990; Cronan and Grigal, 1995; Huntington et al., 2000; Jenkins 2002). The majority of nutrient capitol and alkalinity in these soils are contained in the organic surface horizon (comprised of decomposing plant material) and surficial mineral horizons (topsoil) (Bailey et al. 2021; Page-Dumroese et al., 2021). This means that retention of organic horizons and topsoil is key in maintaining soil productivity (Bailey et al., 2021).

Proposed vegetation management activities may compound effects of acidic deposition potentially resulting in changes to nutrient cycling and productivity. The amount and intensity of soil disturbance is variable depending on the types of activities proposed. Proposed timber harvest (approximately 3651 acres) is expected to result in minor, dispersed disturbance throughout the proposed timber units and is generally thought to recover in the short-term. Tops and limbs, which contain the majority of macronutrients are left on-site. Consequently, timber harvesting itself would be expected to have limited impacts to soil productivity and nutrient losses (Grier et al., 1989). For thinning units, less nutrients would be removed from the site and less impacts would be expected to soil productivity as compared to regeneration units (Grier et al., 1989). Construction and use of skid roads require more extensive and intensive soil disturbance that is expected to result in adverse impacts to soil productivity and nutrient

cycling. All new skid trails created for this project would be treated with USFS and WV best management practices. Enhanced treatments, such as decompaction and recontouring, would be applied to new skid trails on slopes greater than 40% and where impaired hydrologic function, poor soil quality or adverse impacts to soil productivity are observed. These treatments are expected to help reduce negative impacts to soil productivity and soil stability. Landing creation and/or use (proposed on 105 acres) also requires intensive soil disturbance where organic horizons and topsoil are permanently side cast. Adverse impacts to soil productivity are expected on landings which will be seeded, mulched, and left in place for future use.

Effect: Prescribed fire may affect soil chemistry, nutrient cycling, and soil productivity.

Most research evaluating soil response to fire (including wildfire, prescribed fire, pile burning, etc.), is conducted on soils that are drastically different than those present across the Monongahela National Forest. In general, prescribed fire is restorative to a landscape where fire historically was an inherent part of nutrient cycling process (Boerner et al., 2006). Prescribed fire has been shown to increase soil pH, but too intense or too frequent prescribed fire can cause losses of nitrogen, phosphorus, and potassium (DeBano, 1991). This is important to consider in this project area where soils are already impacted by acidic deposition and have limited amounts of available soil nutrients (Tiedemann et al., 2000). Studies have found that prescribed fire can be an important management tool, but if implemented too frequently (five fires per decade), can result in long-term detrimental effects to the soil resource in the form of nutrient losses and resultant decreased soil productivity (Tiedemann et al., 2000; Williams et al., 2012).

The majority (75%) of soils within the project area are rated as having moderate risk of damage by fire (Soil Survey Staff, 2021). Moderate risk of damage by fire indicates fire damage can occur due to steep slopes, and some maintenance is needed, but fair performance can be expected. Remaining areas are mapped as having low risk of damage by fire. Low indicates fire damage is unlikely, good performance can be expected, and little or no maintenance is needed.

Low to moderate intensity prescribed fire is proposed on a two-to-five-year rotation across three burn blocks totaling 920 acres. Burn blocks were designed to overlap with other proposed actions (wildlife openings, the proposed savannah, and some thinning and regeneration units) to achieve a particular goal (oak regeneration, wildlife opening maintenance, etc). Prescribed fire is expected to result in some consumption of organic horizons (litter) and dispersed areas of exposed mineral soil to promote oak regeneration (Barnes and Van Lear, 1998; Yaussy, 2000; Greenberg et al., 2012). Proposed burn frequency and intensity is expected to result in increased soil pH which would benefit soil productivity in these areas. Short-term areas of discontinuous erosion may be incurred in areas of bare mineral soil.

Effect: Watershed restoration activities may improve long-term soil productivity.

Proposed actions related to watershed restoration (soil restoration activities on Forest roads and existing linear features), large woody material additions, riparian buffer improvement, and aquatic organism passage (AOP) restoration) require soil disturbance to implement. Riparian buffer improvements (spot decompaction where needed, buffer expansion, native plantings) and AOP restoration (stabilization, repair, replacement or removal), and large woody material additions may require the use of heavy equipment. Soil restoration activities proposed for existing linear features, such as decompaction, spot treatments and recontouring, have been shown to address concerns with soil compaction, improve infiltration, reduce erosion and improve soil productivity (Luce, 1997; Kolka, 2001; Madej, 2001). These actions are also expected to slow the export of nutrients from the ecosystem, and promote soil carbon sequestration (Butler et al., 2015).

Multiple watershed restoration activities, including riparian buffer improvement, AOP restoration, and LWM additions, are located in floodplains. Floodplain soils may be wet and the close proximity to a stream increases the risk of erosion, sedimentation and compaction (Soil Survey Staff, 2021). The use of WV State and Forest Service BMPs will reduce negative impacts to soil productivity and water quality (USDA Forest Service, 2012; WVDOF, 2018).

Watershed restoration activities outlined above require soil disturbance for implementation and may result in short-term increases in erosion. These activities aim to address soil compaction and existing sources of erosion and sedimentation in the long term, thereby improving soil productivity on 90 acres of existing linear features. Improvements to soil productivity can be attributed to decreased soil compaction, improved hydrologic connectivity, and where needed, return fill material back to road/trail surfaces. Riparian enhancements and LWM additions facilitate topsoil accumulation and retention and promote soil stabilization along streams preventing erosion and soil losses. AOP improvements improve soil productivity through improved stability and reduced erosion.

To summarize, proposed watershed restoration actions would result in a short-term increase in soil erosion but would decrease soil compaction and erosion in the long-term. Ultimately these actions are expected to improve soil productivity in the long-term and move soil conditions towards those desired as outlined in the Forest Plan (Goal SW01, p. II-9; USDA Forest Service, 2012).

Effect: Climate change may further stress soil productivity, particularly in areas where soil productivity has already been negatively impacted through acid deposition or soil disturbance.

Climate change is expected to result in increased air temperatures and less frequent, more intense precipitations events (Butler et al., 2015). Late season droughts and subsequent soil moisture deficits are expected to become more frequent given projected climate change scenarios (Butler et al., 2015). Resultant changes to soil function from climate change are important to consider given more than 40% of global terrestrial carbon is stored in the soils of forests, grasslands and shrublands (Jackson et al., 2017). It should be noted that differing forest types or ecosystems have different soil carbon storage capacities (Butler et al., 2015). For instance, mixed oak forest types throughout the project area have less soil carbon storage potential than mixed cove forests. But, across all forest types, soil carbon storage has benefits beyond just offsetting greenhouse gas emissions. Soil carbon supports a variety of soil functions such as nutrient storage and cycling, improved soil structure and increased water storage and filtration (Pouyat et al., 2020). Organic matter (litter/duff) retention is critical for maintaining or improving climate change resiliency as it promotes long-term growth, carbon storage, nutrient cycling, water conservation and microbial health (Curzon et al., 2021; Kersey and Myrold, 2021; Page-Dumroese et al., 2021). This is applicable to the Upper Cheat River project area where soils have moderate acid deposition risk and have limited stores of plant available nutrients.

The extent of expected changes across the landscape are variable and dependent upon site-specific conditions. Areas where soil productivity is already impaired (from past acid deposition or soil disturbance) may be more vulnerable to the projected conditions from climate change (Pouyat et al., 2020). Steeper areas are likely to have less water infiltration and more runoff and erosion, negatively affecting soil productivity. Soils on south facing slopes are also particularly vulnerable to increases in temperature and decreased moisture given they are relatively warmer and drier due to aspect (Butler et al., 2015). Soil moisture deficits may be exacerbated by increased evapotranspiration rates under anticipated extended growing seasons in this region (Butler et al., 2015). Soils already negatively impacted by anthropogenic activities (like skid trails, landings, or other linear features) are likely to be further stressed and less resilient under projected climate change scenarios (Butler et al., 2015).

Proposed actions have the potential to either positively or negatively impact the soil resource in respect to climate change. Proposed actions that require soil disturbance (timber and wildlife habitat enhancements) may reduce soil carbon storage capacity and resiliency due to the required displacement of organic matter and topsoil as well as deep soil compaction. Without treatment, these impacts would persist in the long-term. Proposed soil restoration treatments across skid trails are expected to help reduce long-term negative impacts to soil productivity and promote resiliency. Similarly, watershed restoration activities would help to improve long-term soil function, productivity, and resiliency in those areas as they would return soil material back to the site and promote infiltration of precipitation thereby increasing water holding capacity and reducing erosion (Curzon et al., 2021; Kersey and Myrold, 2021; Page-Dumroese et al., 2021).

Table 36. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Soil Specialist Report	UCR_Soil_FXAnalysis_Nov302021

Recreation and Scenery

This section includes effects pertaining to recreation and scenery that have been identified for detailed analysis:

Effect: Treatment of existing linear features and opening currently closed roads may change dispersed recreation access (hunting, hiking, etc.)

The range of treatments on existing linear features for watershed and soil health depends on the resource conditions created by these features and future needs from other resources. Up to 50 miles of linear features have been identified to receive some level of soil restoration activities. The full 50 miles of linear features are not expected to receive decompaction and recontouring; some lengths may only require spot treatment to address resource concerns. For features that would receive decompaction and recontouring to address a soil and water concern, ease of access for dispersed recreation could become more difficult. Although this could reduce access for some that prefer a wide bench, it would also prevent illegal usage of UTV's and other off-road vehicles to more remote locations on the forest that can be difficult to enforce. Some of the existing linear features would be reformed into a more sustainable bench where these features overlap with system trails or proposed system trails in the Pheasant Mountain Trail system through an upcoming project proposal.

MP 3.0 prioritizes motorized recreation, and this project proposes to open approximately 20 miles of currently closed National Forest System roads for 3-5 years following timber harvests. This would temporarily increase access to areas of the Forest and provide hunting opportunities that would have the additional benefit of controlling deer in regeneration timber harvest units experiencing deer browse pressure.

Effect: Commercial timber harvests may be visible from popular viewpoints and travel routes.

The scenery within the entire project area is naturally appearing with variable patterns of forested lands and agricultural lands. Most of the project area is recorded as having moderate existing scenic integrity while others are rated as having high existing integrity areas along river corridors. Even along these river corridors with a rating of high existing scenic integrity, the mixed land uses show considerable human activity such as timber harvest, roads, and private developments. Each of the sensitive viewpoints at developed recreation sites and high existing scenic integrity travel ways are listed in Table 37 along with a summary of the viewshed from each site.

Table 37. Scenic integrity of sensitive viewpoints and high scenic integrity travel ways

Viewpoint/Corridor	Scenic Integrity
Horseshoe Run and State Route 7	GIS files identify this river corridor which encompasses much of this travel route as having high existing scenic integrity. However, existing conditions are a mixture of public and private lands and the forested landscape is broken up by private residences and agricultural lands. Therefore, this corridor exhibits moderate scenic integrity class characteristics.
Cheat River and State Route 72	GIS files identify this river corridor which encompasses much of this travel route as having high existing scenic integrity. However, existing conditions are a mixture of public and private lands and the forested landscape is broken up by private residences and agricultural lands. Additionally, previous private and federal timber harvests are evident on the landscape, but not dominant. Therefore, this corridor exhibits moderate scenic integrity class characteristics.

Viewpoint/Corridor	Scenic Integrity
Camp Horseshoe and Horseshoe Campground and Recreation Area	GIS files identify these highly used recreation sites as having a high scenic integrity. Current on-the-ground conditions support this scenic integrity class.
Olson Fire Tower	GIS files identify this popular recreation site as having moderate existing scenic integrity. The fire tower provides a 360 degree view, including views of Canaan Mountain, Blackwater Canyon, and a moderate scenic integrity portion of the Upper Cheat River project area. Previous private and federal timber harvests and agricultural openings are visible from the tower. Current on-the-ground conditions support the scenic integrity class of both the tower and its viewshed.

The current on-the-ground conditions along Horseshoe Run/State Route 7 corridor and the Cheat River/State Route 72 corridor would be more fitting of the moderate scenic integrity which would mean that the degree of deviation from the landscape character would be evident, but not dominant. Proposed commercial timber harvest units within the high scenic integrity GIS layer units are R20, R45, R47, R48, R11, R8, R10, R136, R118 and R119. The units would all be within the foreground or middleground from the travel way. Field verification identified only R45 and R20 would be partially visible for travelers on State Route 7 and only R118 would be visible for travelers on State Route 72. Unit R118 is a proposed helicopter unit; therefore, trees are typically retained along the roadway for operational safety and would provide a visual buffer between the harvest and the roadway. These units are spread out across this travel route and therefore would be expected to keep with a moderate scenic integrity, meaning the proposed actions would not dominate. There are a mixture of Recreation Opportunity Spectrum (ROS) settings within this corridor, including roaded natural, semi-primitive motorized, and rural. Maintaining moderate scenery in these ROS settings would be the “norm” and would not fall into the “inconsistent” nor “unacceptable” category.

Timber harvest units in proximity to Camp Horseshoe and Horseshoe Campground and Recreation Area were adjusted to reduce visibility. Unit R47 would no longer be visible and Unit R45 would be partially visible from Horseshoe Campground and Recreation Area.

Using the Google Earth viewshed analysis tool with a height of 27 meters to correspond to the height of the highest accessible location atop the tower, thirteen visible proposed commercial harvest units were identified in the middleground (R125, R129, R64, and R65) and the background (R117, R118, R138, R50, R51, R71, R52, R121, and R123). Field verification determined that all units in the middleground would be discernable to the public, but units in the background would be unnoticeable by most visitors.

Scenic impacts from harvests should become unnoticeable five to ten years following harvest, though the casual observer may not detect impacts in as short as three years due to the rapid flush of new growth associated with regeneration harvests in these forest types. The units would be more visible during summer months when leaves are on the trees.

Table 38. Applicable project file documentation to support effects analysis

Supporting Documentation	File Name(s)
Recreation and Scenery Specialist Analysis	UCR_SpecialistAnalysis_Recreation2021206

Agencies, Organizations and Persons Consulted

This project was listed on the Monongahela National Forest's Schedule of Proposed Actions (SOPA) in July 2020 and has been listed on every subsequent publication. Two virtual pre-scoping public meetings were held in December 2020 to introduce the project area, planning process, need for action, possible actions to meet the need. Approximately 187 individuals, elected officials, groups, agencies, and nearby landowners were mailed/emailed notice of the pre-scoping virtual open house and notices were posted in two local newspapers. Approximately 80 people were in attendance across the two sessions.

Legal notices were placed in the *Grant County Press* (the newspaper of record) and the *Parsons Advocate* (local newspaper) on June 29 and June 30, 2021, respectively, to initiate a 30-day public scoping of the project's initial proposed actions. Notice of the scoping period was mailed/emailed to approximately 443 contacts. An interactive scoping StoryMap provided an additional measure of reaching the public and inviting comment. Response from commenters contributed to the refinement of the proposed action and identification of issues requiring further analysis.

Legal notices announcing the release of the environmental assessment were placed in the *Grant County Press* (newspaper of record) and the *Parsons Advocate* (local newspaper), on March 1 and March 2, 2022, respectively, to initiate a 30-day notice and comment period. Notice of the comment period was mailed/emailed to 755 contacts. Forest Service responses to the comments can be viewed online or provided upon request.

A public open house was held on June 22, 2022 at the Parsons Volunteer Fire Department as a result of comments received during the 30-day comment period. Approximately 32 individuals attended and were able to discuss the project with interdisciplinary team members.

The Forest is awaiting response to our formal consultation with U.S. Fish and Wildlife Service in the form of a Biological Opinion in accordance with Section 7 Endangered Species Act requirements for the activities moved forward in this decision. Once received, the U.S. Fish and Wildlife Service Biological Opinion will become part of the project record and any additional design features/mitigations suggested will be incorporated into the final Decision Notice.

Mailing lists of agencies, organizations, interested persons, and adjacent landowners consulted during this environmental analysis are located in the project record.

2. Finding of No Significant Impact (FONSI)

The Finding of No Significant Impact documents the reasons why an action, not otherwise excluded from documentation in an environmental assessment (EA) or environmental impact statement (EIS) in accordance with 40 CFR §1501.3, will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. The Finding of No Significant Impact discussion considers all information included in the environmental assessment, as well as documentation in the project record. Pertinent specialists have reviewed the proposal and, based on their input, the responsible official made the following determinations with regards to the potentially affected environment and degree of effects considered for a Finding of No Significant Impact.

Potentially Affected Environment

The Upper Cheat River project area is comprised of 86,138 acres and includes 33,991 acres of National Forest System (NFS) lands within the Upper Cheat River watershed, with the remainder privately owned. The majority (99.5%, 33,806 acres) of the project area is located within management prescription (MP) 3.0 of the 2006 Monongahela National Forest Land and Resource Management Plan (Forest Plan). The remaining 0.5% of NFS land in the project area is MP 4.1 (Spruce and Spruce-Hardwood Restoration) and MP 6.1 (Wildlife Habitat Emphasis). Due to limited acreage and a lack of need for the types of activities proposed in this project, no activities are included in the MP 4.1 and 6.1 areas as a part of the Upper Cheat River project. The small communities of Hile Run, Horseshoe, Lead Mine, Parsons, Shafer, Sell, and St. George are either found within or border the boundary of the project area.

Degree of Effect

Both short- and long-term effects.

Both beneficial and adverse effects.

Short-term, long-term beneficial, and adverse effects, of the action were analyzed and disclosed for this project. Effects were summarized within the Environmental Impacts section of this document, with the resource specialist's reports containing more detailed analysis (e.g. methodologies) available online. Specialist's reports should be referred to in order to gain a full understanding of the scope and scale of potential effects. In summary, the interdisciplinary team did not identify any significant adverse effects, either short- or long-term, associated with implementing the proposed action. A summary is provided for each resource below.

Air Quality: Prescribed burn emissions would have a short-term effect on air quality in the project area leading to potential health and visibility issues. The majority of smoke would dissipate within 24 hours. Air quality in and immediately adjacent to the burn blocks could be impacted for several days following each prescription burn but is not expected to contribute to an exceedance of the National Ambient Air Quality Standards set by the Clean Air Act. It is not anticipated that emissions associated with timber harvest during this project will result in a violation of the National Ambient Air Quality Standards.

Carbon and Greenhouse Gas Emissions: Timber harvesting and prescribed burning generally result in a negligible amount of carbon loss from the mineral soils typically found in the United States, particularly when operations are designed in a way that minimizes soil disturbance. Although timber harvest and prescribed fire can also affect the carbon stored in the understory and forest floor organic layer consisting of debris in various stages of decomposition, the carbon loss would be negligible given it is not stable or long-lived and would be replaced within months to a few years. By reducing vegetative competition in the understory, the proposed prescribed burnings (some following harvest) would help establish oak that would provide additional mast for wildlife and increase the ability of harvested areas to regenerate more quickly. This would help to support forest health in a changing climate and reducing GHG emissions over the long-term. Carbon emissions associated with prescribed fires are mostly from duff, litter, and dead wood which would otherwise decay quickly over time, releasing carbon to the atmosphere, even in the absence of fire. Furthermore, any initial carbon

emissions from this proposed action will be balanced and possibly eliminated as the stand recovers and regenerates, because the remaining trees and newly established trees typically have higher rates of growth and carbon storage. Any initial carbon emissions during the implementation of the proposed project would have a temporary influence on atmospheric carbon concentrations, because carbon will be removed from the atmosphere as forests regrow, minimizing or mitigating any potential cumulative effects.

Vegetation: Short-term effects of silviculture prescriptions include an increase in down woody debris, open stands, and early successional vegetation. Long-term effects include improved forest health through the diversification of age classes. The local economy would benefit from the sale of timber. Over the next decade, the proposed action is expected to generate approximately 6.4 million dollars of revenue and cost approximately 5.9 million dollars to implement. Implementation of the proposed action would still yield an increase of 138% in the amount of late-successional stands due to many of the stands in the project area being the same age.

Ecology: Managing mixed mesophytic forests for age-class diversity will help provide habitat structure for numerous species of plants and wildlife in the eastern U.S. that depend on this ecosystem, as successional changes set in motion by regeneration harvests continue over the long-term. Commercial timber harvest and associated skid trail and landing construction and use and restoration have the potential to actively spread and/or facilitate the natural spread of non-native invasive species (NNIS) through opening the canopy and increasing light to the forest floor or through use of equipment. Shade-intolerant low priority NNIS probably would spread and persist until the tree canopy closes back over the harvest units. Some of these species can persist under a closed canopy indefinitely, but they do not produce fruit and spread under such conditions. Other species die out once the canopy closes. Shade-tolerant, high priority NNIS, however, are likely to persist and spread unchecked, even after the tree canopy closes. Tiering to the 2010 Forest-wide Nonnative Invasive Plant Management Project environmental assessment would allow treatment of existing infestations, which would reduce the chances that new NNIS would become established or existing infestations would expand. As areas revegetate, they would be less vulnerable to new invasions.

Hydrology: The use of WV and USFS best management practices and design features incorporated into the proposed action comply with the Clean Water Act. Vegetation removal does not approach thresholds expected to result in detectable changes to water quantity dynamics or stream temperature changes due to consideration of hydrologically sensitive areas during harvest unit layout and incorporation of stream buffers that provide additional water storage capacity and stream shading. As such, new skid trails within conventional units represent a localized, low risk for negative effects to watershed processes and aquatic resources due to project planning to avoid sensitive areas and a commitment to restore skid trails post-harvest. Watershed restoration activities may result in short-term sedimentation to implement the activities but would result in long-term benefits to watershed processes. Effects from herbicide use on human health or the aquatic environment are not expected.

Aquatic Species: The proposed action is not expected to adversely affect aquatic organisms through altered sediment dynamics. The distribution of timber harvests across the project area, layout of timber units to avoid hydrologically sensitive areas, improvements to the overall road and skid trail network to increase groundwater infiltration, and riparian buffers all decrease the likelihood of temperature changes driven by vegetation removal. Watershed restoration activities may also mitigate some of the temperature increases from climate change that are expected to shift the structure of aquatic ecosystems in the areas and reduce the viability of coldwater dependent species, such as brook trout. Brook trout was used as a surrogate species (i.e. the most sensitive aquatic species to temperature and sediment changes) for the effects to the five Regional Forester Sensitive Species with potential habitat. No federally-listed aquatic species occur in this project area.

Wildlife Species: A formal biological assessment was submitted to the U.S. Fish and Wildlife Service on February 23, 2022 to comply with Section 7 of the Endangered Species Act. Determinations were as follows: “no effect” to Cheat Mountain salamander and rusty patched bumble bee; “not likely to adversely affect” Virginia big-eared bat; “likely to adversely affect” Northern long-eared bat and

Indiana bat. The final decision notice will not be signed until consultation is completed and any recommendations from the Service are incorporated. Beneficial, adverse, short- and long-term effects are summarized in the "Endangered Species Act - Threatened, Endangered, Proposed and Candidate Species and Critical Habitat" section of the environmental assessment and described in detail in the biological assessment. Beneficial, adverse, short- and long-term effects to all terrestrial wildlife Regional Forester Sensitive Species are summarized in the "Sensitive Species (Forest Service Manual 2670)" section of the environmental assessment and described in detail in the biological evaluation for terrestrial wildlife document. No Regional Forester Sensitive Species received a determination of "will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species".

Botany Species: A formal biological assessment was submitted to the U.S. Fish and Wildlife Service on February 23, 2022 to comply with Section 7 of the Endangered Species Act. Determinations were as follows: "no effect" to Virginia spirea and shale barren rock cress; "not likely to adversely affect" small whorled pogonia. The final decision notice will not be signed until consultation is completed and any recommendations from the Service are incorporated. Beneficial, adverse, short- and long-term effects are summarized in the "Endangered Species Act - Threatened, Endangered, Proposed and Candidate Species and Critical Habitat" section of the environmental assessment and described in detail in the biological assessment. Beneficial, adverse, short- and long-term effects to all plant Regional Forester Sensitive Species are summarized in the "Sensitive Species (Forest Service Manual 2670)" section of the environmental assessment and described in detail in the Botany/Ecology specialist report. No Regional Forester Sensitive Species received a determination of "will impact individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or cause a loss of viability to the population or species".

Soils: Harvesting timber and retaining tree tops and limbs would result in minor, dispersed disturbance throughout the proposed timber units and in limited short-term impacts to soils productivity and nutrient loss generally. Soil disturbance required to construct and/or use new skid trails and/or landings is expected to result in short-term erosion and compaction. Some discontinuous areas of soil compaction and decreased soil productivity may persist in the long-term on both new and existing landings, though short-term erosion would be mitigated through seeded and mulching landings post-harvest. Long-term detrimental soil disturbance would be reduced and losses to soil productivity would be mitigated by utilizing WV State and Forest Service best management practices, on all skid trails following harvest, and enhanced measures on skid trails found to have impaired hydrologic function or soil quality. Detrimental soil disturbance from wildlife habitat enhancements is expected to be dispersed in nature and unlikely to persist in the long-term, with an exception of areas of concentrated equipment or vehicle use that may result in soil compaction and rutting that is slow to recover without treatment. Prescribed burn frequency and intensity is expected to result in increased soil pH which would benefit soil productivity in these areas. Short-term areas of discontinuous erosion may be incurred in areas of bare mineral soil. Watershed restoration actions would result in a short-term increase in soil erosion, but long-term decrease in soil compaction and erosion increase in soil productivity

Heritage Resources: No short or long-term adverse effects are likely to occur to historic properties. Incorporated design criteria will avoid/protect cultural resources within the project area.

Recreation and Scenery: Decompaction and recontouring of linear existing linear features may make ease of access for dispersed recreation more difficult. The project would temporarily increase access to areas of the Forest and provide hunting opportunities by opening roads for several years following timber harvests to control deer browse. Scenic impacts from harvests should become unnoticeable five to ten years following harvest, though the casual observer may not detect impacts in as short as three years due to the rapid flush of new growth associated with regeneration harvests in these forest types.

Effects on public health and safety.

Public health and safety concerns related to herbicide use and flooding were analyzed and described in the “Additional Effects Analysis” section of this document. No adverse risks from herbicide application were identified for the general public. Based on scoping comments, one timber unit proposed to receive herbicide application was adjusted to avoid the watershed of the landowner’s spring source. Results of the watershed assessment show that the proposed vegetation removal does not approach thresholds expected to result in detectable changes to water quantity dynamics. Closure orders may be issued to prevent public access to harvest units and prescribed burn areas, to areas of roadwork, and areas (e.g., trails or trailheads) where the safety of individuals or property could be impacted by project activities. Therefore, implementation of the proposed action is not expected to have significant negative effects on public health and safety.

Effects that would violate Federal, State, or local law protecting the environment.

The Forest Plan Final Environmental Impact Statement and Record of Decision document the consistency of the Forest Plan with laws and requirements imposed for environmental protection. This project’s activities are consistent with management direction and standards and guidelines mandated by the Forest Plan. Description of compliance can be found in the “National Forest Management Act (NFMA) - Land Management Plan Consistency” and the “Other Law, Regulation and Policy Consistency” sections of this document.

On April 22, 2022, after the release of the draft EA and the associated comment period, the President issued Executive Order 14072 “*Strengthening the Nation’s Forests, Communities, and Local Economies*”. Subsequently, the Forest received one letter requesting the project be reviewed in light of the new EO and one petition requesting postponement of the decision until an inventory of old growth could be completed. The Monongahela National Forest is awaiting guidance regarding this new EO. Currently, comments are being solicited from the public by the US Department of Agriculture and the US Department of the Interior on the plans around federal old-growth and mature forests in response to this Executive Order.

Implementation of the proposed action does not threaten a violation of federal, state, and local laws protecting the environment.

3. Draft Decision Notice

Upper Cheat River Project

U.S. Forest Service

Cheat-Potomac Ranger District, Monongahela National Forest

Tucker, Barbour, and Preston Counties, West Virginia

Decision and Rationale

I have decided to authorize activities described in the "Proposed Action" section, including two modifications that resulted from public feedback following the environmental analysis and review of regulatory compliance. Modifications are indicated by footnotes on pages 10 and 18. The modifications resulted from information received from an attendee of the June 2022 informational open house and from a commenter during the March 2022 public comment period. During the open house, Forest staff was informed of a natural slip adjacent and within commercial timber unit R11. LiDAR images and field verification indicated a tree blowdown and ephemeral drainage that extended beyond the 100-foot riparian buffer and into Unit R11. The proposed action has been adjusted to avoid harvest activities in this sensitive area and unit R11 has been reduced from 25 acres to 20 acres (page 10). Modification of design feature SoilWater-3 resulted from a commenter requesting information on 10 units with steep slope inclusions. The interdisciplinary team reviewed the units in question, and have included additional provisions for Units R35, R65, and T145 (page 18) to ensure compliance with Forest Plan Standard SW07. The team verified that the remaining units with steep slopes inclusions would comply with SW07 through either utilizing existing features on steep slopes and recontouring afterwards or avoiding skid trail construction on these inclusions.

Throughout the project planning process, potential issues raised both internally or by the public and stakeholder groups were discussed among the interdisciplinary team. I considered specialists effects analyses in the Environmental Impacts section of this document as I made the decision to implement the Proposed Action. Project activities will incorporate the best management practices, design features, and mitigation measures as indicated in the Proposed Action, in order to reduce or eliminate negative impacts while moving the project area's existing conditions toward the desired future conditions as described in the "Purpose and Need for the Proposed Action" section.

Summary of Public Involvement

A description of public involvement is included in the Agencies, Organizations and Persons Consulted section of the environmental analysis.

Findings

This draft decision notice incorporates all previous information in the environmental assessment and finding of no significant impact, as well as information included in the project record. Findings required by other laws, regulations, and policy applicable to the proposal can be found in the "Other Law, Regulation and Policy Consistency" section.

I find no significant effects; therefore, an environmental impact statement will not be prepared.

Implementation

As per 36 CFR218.12, if no objections are filed within the 45-day objection period, implementation of this decision may occur on but not before, the fifth business day following the close of the objection-filing period. If an objection is filed, this decision cannot be signed or implemented until the reviewing officer has responded in writing to all pending objections.

Administrative Review and Objections

The proposed project is an activity implementing a land management plan and is subject to the pre-decisional objection process at 36 CFR 218 Subparts A and B.

How to Object and Timeframe

The opportunity to object ends 45 days following the date of publication of the legal notice in the *Grant County Press*. The publication date of the legal notice in the newspaper of record is the exclusive means for calculating the time to file an objection, and that those wishing to object should not rely upon dates or timeframe information provided by another other source. A copy of the legal notice can be found on the project's website: https://www.fs.usda.gov/project/?project=58364

Objections will be accepted only from those who have previously submitted specific written comments regarding the proposed project during scoping or other designated opportunity for public comment. Issues raised in objections must be based on previously submitted timely, specific written comments regarding the proposed project unless based on new information arising after designated comment opportunities §218.8(c).

The objection must contain the minimum content requirements specified in §218.8(d) and incorporation of documents by reference is permitted only as provided in §218.8(b). It is the objector's responsibility to ensure timely filing of a written objection with the reviewing officer. All objections are available for public inspection during and after the objection process.

Written objections, including attachments, must be filed with: Objection Reviewing Officer, Attn: PAL-LSC Objections, Suite 700, USDA Forest Service, Eastern Region, 626 E. Wisconsin Avenue, Milwaukee, WI 53202, 414-944-3963 (fax). The office business hours for those submitting hand-delivered objections are: 8:00 a.m. to 4:30 p.m. Monday through Friday, excluding holidays. Electronic objections must be submitted in a format such as an email message, plain text (.txt), rich text format (.rtf), or Word (.doc, .docx) to objections-eastern-region@usda.gov. Include the subject header "Objection – Upper Cheat Project" in the email subject line, fax cover page, or envelope.

Responsible Official

Jon Morgan, District Ranger, Cheat-Potomac Ranger District, 2499 North Fork Highway, Petersburg, WV 26847; or fax to 304-257-2482

Draft – no signature

JONATHAN MORGAN

Cheat-Potomac District Ranger

Appendix A. References

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Appendix B. Maps

- Vegetation Management Map – East
- Vegetation Management Map – West
- Wildlife Enhancements and Prescribed Fire Map – East
- Wildlife Enhancements and Prescribed Fire Map – West
- Stream and Riparian Enhancement Map – East
- Proposed Stream and Riparian Enhancement Map – West
- System Road Status Map

Upper Cheat River Project, East
Proposed Vegetation Management Map
Monongahela National Forest

- Conventional Log Landing
- Helicopter Log Landing
- Skid Trails Outside of Units
- Temp Road Construction
- Forest Service Road Reconstruction
- Forest Service Road Maintenance
- Forest Service System Roads
- County/State Routes
- TSI Units
- Conventional Timber Unit
- Cable Timber Unit
- Helicopter Timber Unit
- Upper Cheat River Project Boundary
- Forest Service Ownership

Miles
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Project Location Map
Coketon
Hambleton
Parsons

MNF GIS
UTM, Zone 17
NAD 83
TMB
7/27/2022

Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. This map has no warranties as to its contents or accuracy.

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Roads data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed August, 2021.

Upper Cheat River Project, West
Proposed Vegetation Management Map
Monongahela National Forest

- Conventional Log Landing
- Helicopter Log Landing
- Skid Trails Outside of Units
- Temp Road Construction
- Forest Service Road Reconstruction
- Forest Service Road Maintenance
- Forest Service System Roads
- County/State Routes
- TSI Units
- Conventional Timber Unit
- Cable Timber Unit
- Helicopter Timber Unit
- Upper Cheat River Project Boundary
- Forest Service Ownership

Project Location Map

Coketon
Hambleton
Parsons

Saint George
Parsons

TUCKER COUNTY
WEST VIRGINIA

MNF GIS
UTM, Zone 17
NAD 83
TMB
12/09/2021

N
W E
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Miles
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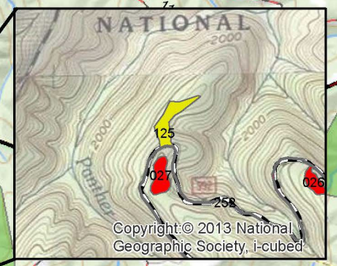
Original data was compiled from multiple source data and may not meet the U.S. National Mapping Accuracy Standard of the Office of Management and Budget. This map has no warranties as to its contents or accuracy.

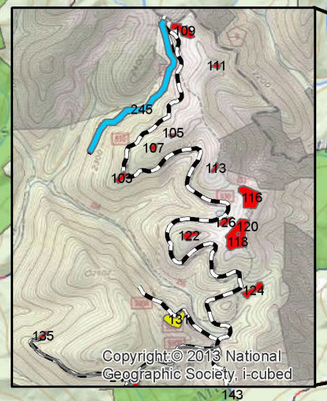
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed August, 2021.

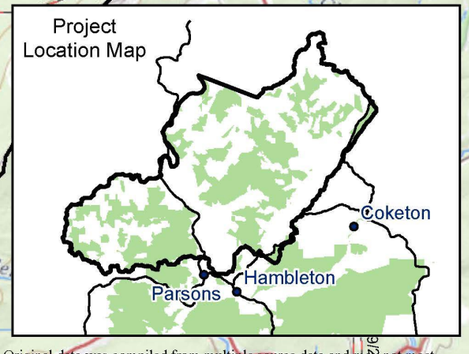
Upper Cheat River Project, East
Proposed Wildlife Enhancements & Prescribed Fire Map

Monongahela National Forest

- Fire Handlines
- Forest Service Roads
- County/State Routes
- Exisiting Wildlife Opening Maintenance
- Burn Blocks
- Cut Back Border
- Daylighting
- Wildlife Opening Expansion
- Upper Cheat River Project Boundary
- Forest Service Ownership







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Upper Cheat River Project, West
Proposed Wildlife Enhancements & Prescribed Fire Map

Monongahela National Forest

- Fire Handlines
- Forest System Roads
- County/State Routes
- Exisiting Wildlife Opening Maintenance
- Burn Blocks
- Cut Back Border
- Daylighting
- Wildlife Opening Expansion
- Savannah
- Upper Cheat River Project Boundary
- Forest Service Ownership

Project Location Map

Coketon
Hambleton
Parsons

TUCKER COUNTY

WEST VIRGINIA

Saint George

Parsons

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Upper Cheat River Project, East
Proposed Stream & Riparian Enhancement Map
Monongahela National Forest

- AOP Replace
- AOP Stabilize Ford
- AOP Upgrade/Replace
- Soil Restoration Activities on System Roads
- Forest Service System Roads
- Soil Restoration Activities on Ex. Linear Features
- Large Woody Materials
- County/State Routes
- Riparian Buffers
- Source of Large Woody Material
- Upper Cheat River Project Boundary
- Forest Service Ownership

Riparian Buffers

Riparian Buffers

Riparian Buffers

Riparian Buffers

existing haul road

Saint George

TUCKER COUNTY

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Project Location Map

Coketon
Hambleton
Parsons

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Upper Cheat River Project, West
Proposed Stream & Riparian Enhancement Map

Monongahela National Forest

- AOP Replace
- AOP Stabilize Ford
- AOP Upgrade/Replace
- Soil Restoration Activities on System Roads
- Forest Service System Roads
- Soil Activities on Ext. Linear Features
- Large Woody Materials
- County/State Routes
- Riparian Buffers
- Source of Large Woody Material
- Upper Cheat River Project Boundary
- Forest Service Ownership

Project Location Map

Coketon
Hambleton
Parsons

TUCKER COUNTY
WEST VIRGINIA

Saint George
Parsons

Riparian Buffers
Riparian Buffers
Riparian Buffers

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Upper Cheat River Project
Proposed System Road Status Map
Monongahela National Forest

- Closed Forest Service System Roads
- Seasonally Open Forest Service System Roads
- Forest System Roads
- County Routes
- Upper Cheat River Project Boundary
- Forest Service Ownership

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Project Location Map

Coketon
Hambleton
Parsons

Saint George
Parsons
TUCKER COUNTY
WEST VIRGINIA

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